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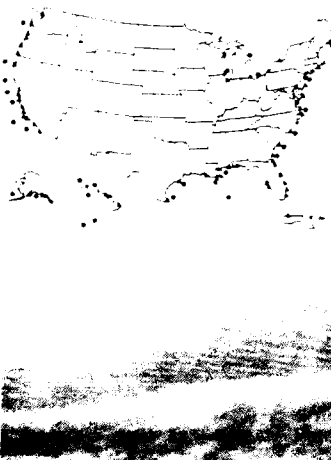
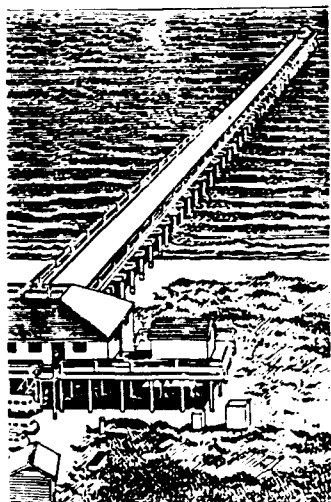


TECHNICAL REPORT CERC-91-8

2



US Army Corps  
of Engineers



## FIELD WAVE GAGING: FIVE-YEAR DEPLOYMENT PLAN, FY90-94

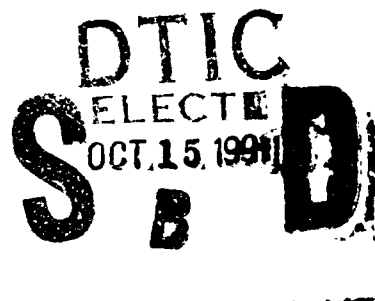
by

David D. McGehee

Coastal Engineering Research Center

DEPARTMENT OF THE ARMY

Waterways Experiment Station, Corps of Engineers  
3909 Halls Ferry Road, Vicksburg, Mississippi 39180-6199



September 1991

Final Report

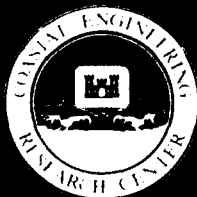
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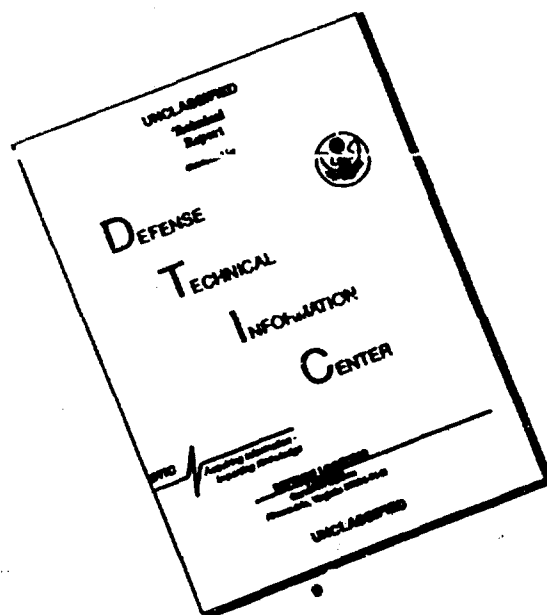


Prepared for DEPARTMENT OF THE ARMY  
US Army Corps of Engineers  
Washington, DC 20314-1000

Under Work Unit 12115



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# Preface

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This is the first Five-Year Deployment Plan of the Field Wave Gaging Program (FWGP), sponsored by Headquarters, US Army Corps of Engineers (HQUSACE). Subsequent plans will be published annually. This report is a product of the Coastal Field Data Collection Program (CFDCP), Coastal Engineering Research Center (CERC), US Army Engineer Waterways Experiment Station (WES), under Work Unit 12115. Mr. J. Michael Hemsley was the former CFDCP Program Manager, and Ms. Carolyn M. Holmes is the present CFDCP Program Manager. The HQUSACE Technical Monitors are Messrs. John H. Lockhart, Jr.; John G. Housley; James E. Crews; and Robert H. Campbell.

This report was prepared by Mr. David D. McGehee of the Prototype Measurement and Analysis Branch (PMAB), Engineering Development Division (EDD), CERC. The FWGP is administered at CERC under the supervision of Mr. William L. Preslar, Chief, PMAB, and Mr. Thomas W. Richardson, Chief, EDD. Mr. Charles C. Calhoun, Jr., and Dr. James R. Houston are Assistant Chief and Chief, CERC, respectively.

Commander and Director of WES is COL Larry B. Fulton, EN. Dr. Robert W. Whalin is Technical Director.

# Introduction

---

The Field Wave Gaging Program (FWGP) is provided by Work Unit 12115 of the Coastal Field Data Collection Program, US Army Corps of Engineers. It is managed by the US Army Engineer Waterways Experiment Station (WES), Coastal Engineering Research Center (CERC). The purpose of the FWGP is to collect coastal wave climatology data sets for use in the planning, design, and operation of coastal projects and for coastal research for all sections of the United States coastline (Figure 1). This goal will be accomplished through a combination of long-term measurements to directly establish wave statistics and short-term measurements to calibrate and verify numerical transformation models and hindcasts. This plan is a schedule of the number, location, and type of wave gages deployed in the current fiscal year (FY90) and to be deployed in the next 4 fiscal years (FY91-FY94).

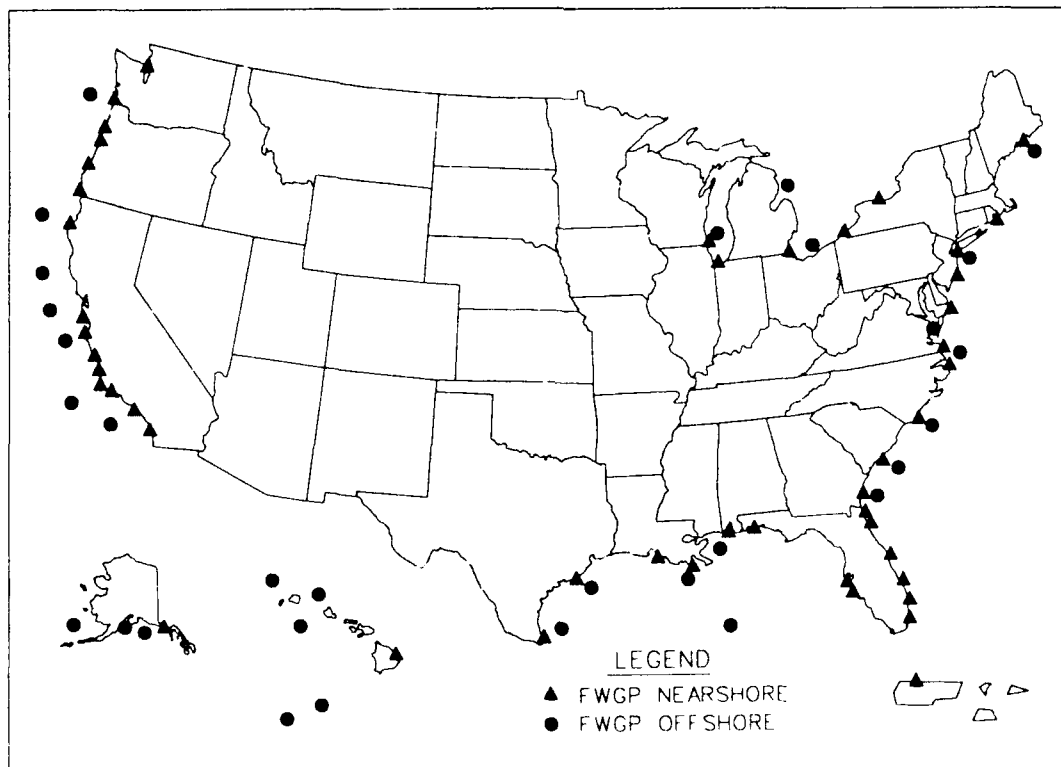


Figure 1. Field Wave Gaging Program Projected Deployments through FY 94

The plan is presented as a series of tables and accompanying charts. The first section consists of the data needs identified by the major subordinate commands (MSC) in a series of meetings held at each Division Headquarters and by CERC researchers for use in model validation. Data requested for improvement of design, operation, or maintenance of existing or future coastal projects, and for calibration and verification of wave propagation/transformation models, included wind and current in addition to directional and non-directional waves. A total of 241 areas were selected, with 176 rated as high priority by the MSC. A table and a chart are presented for each coastal Corps Division with corresponding map index numbers for each area.

These locations represent areas with specific data requirements, and not actual instrument sites. Some areas may require multiple gages, while others may not be suitable for gage deployment. Many have immediate and unique utility for model calibration; others may be redundant for that purpose. Technical, logistic, and economic constraints can vary widely, sometimes for adjacent areas. The interaction of these factors with the MSC needs resulted in the prioritization of the areas in the schedule.

Section II contains the 5-year deployment schedule for each Division that most economically contributes to the needs of the MSC and the goal of the FWGP. The type of gage and deployment date, by quarter, are listed in a table and shown on a Divisional chart. Numerical models that would use an area's data for input or verification are listed. The existing data-base, in gage years, from historical measurements in an area is also included.

The Division deployment maps indicate by symbols existing and scheduled gage locations, as well as discontinued gage sites where sufficient data have been collected to make reliable projections. Other agencies and programs have deployed gages, but only data sets several years in length will be included in the FWGP database. This includes the National Data Buoy Center (NDBC) network of deep ocean, nondirectional gages. These are indicated on the maps with a separate symbol when not supported by FWGP funds. However, the FWGP has funded the installation or the conversion to directional gages by the NDBC. These are included in the table with appropriate comments.

This plan is based on projected funding levels of the FWGP, presented below, according to the FY90 Work Unit 12115 Implementation Plan. It is also based on scheduled developments in gage technology and anticipated gage mortality based on past experience. Cooperative efforts and cost sharing with other Corps and non-Corps elements could enhance the number and schedule of gages in a Division.

| FWGP Projected Funding |     |     |     |     |     |
|------------------------|-----|-----|-----|-----|-----|
| Fiscal Year            | 90  | 91  | 92  | 93  | 94  |
| Budget - M\$           | 1.1 | 1.6 | 2.1 | 2.5 | 2.5 |



# List of Symbols

---

## Data Needs

- $\alpha$  Directional wave spectra
- $\odot$  Nondirectional wave spectra
- $\nabla$  Low-frequency wave, tides, and average water levels
- $\equiv$  Winds
- $\rightarrow$  Currents

## Gage Types

- @ DWG-CM (directional + currents)
- # Puv gage (directional + currents)
- % Anemometer
- \* Single pressure gage (nondirectional)
- = Linear array (directional)
- X Sxy or DWG-1 (directional)
- 0 Nondirectional buoy wave gage
- / Directional buoy wave gage

# List of Abbreviations

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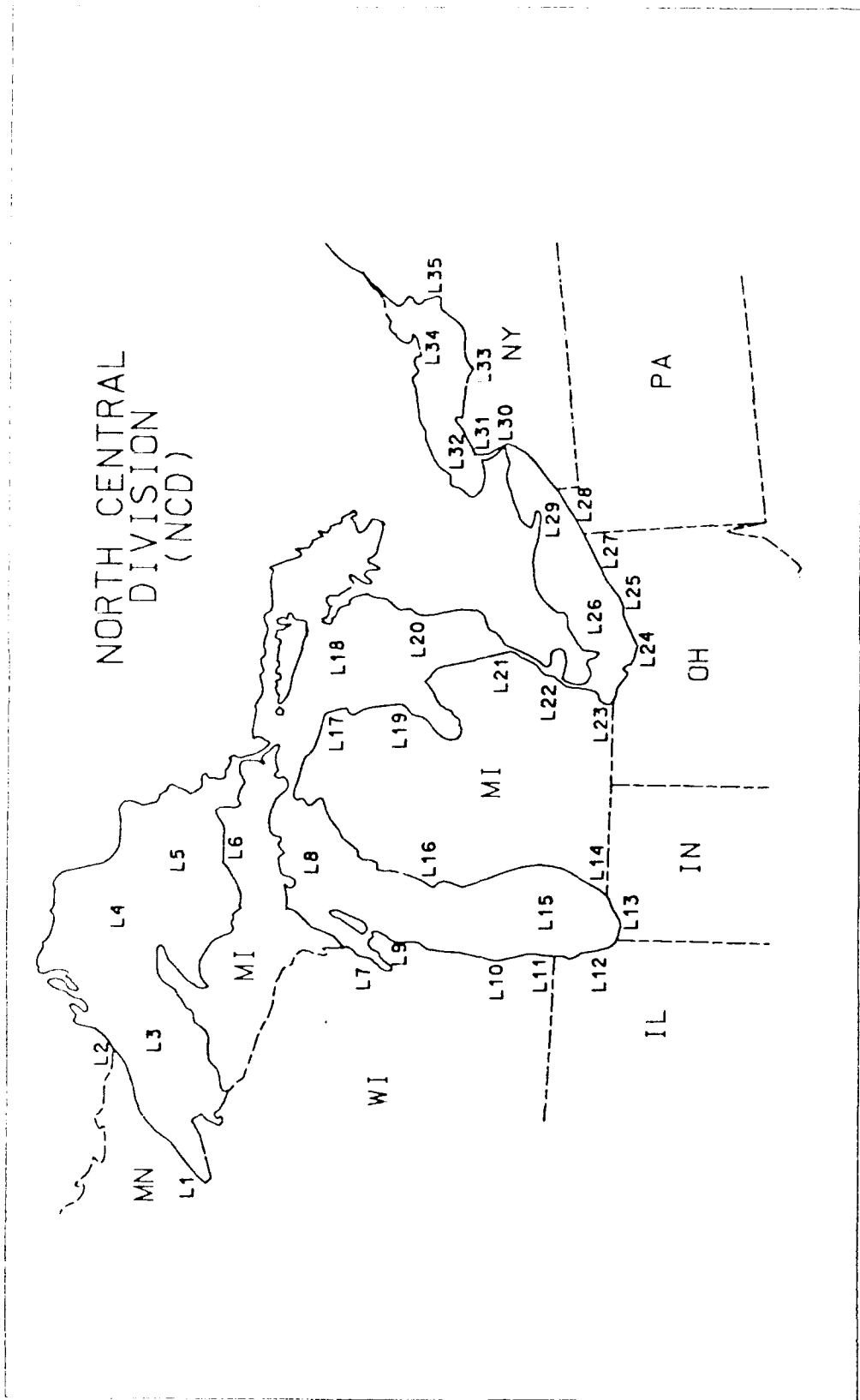
|          |  |
|----------|--|
| BFY      | Budget fiscal year, FY91   |
| CFY      | Current fiscal year, FY90  |
| COE      | Corps of Engineers   |
| CM       | Current meter  |
| C-MAN    | Coastal Marine Automated Network (by NDBC)                                 |
| Dir.     | Directional wave gage or measurement                                       |
| Div.     | Division   |
| DWG-1    | Directional Wave Gage, version 1 (by COE)                                  |
| DWG-CM   | Directional Wave Gage, with current meter option (by COE)                  |
| FY       | Fiscal year  |
| HRB      | Harbor Oscillation model   |
| IE       | Inlets and Entrances Wave/Current Interaction Model                        |
| L        | Long duration gage (30 to 50 years)  |
| MCCP     | Monitoring Completed Coastal Projects Program (by COE)                     |
| MMS      | Minerals Management Service  |
| NDBC     | National Data Buoy Center, National Oceanic and Atmospheric Administration |
| NOAA     | National Oceanic and Atmospheric Administration                            |
| Non-dir. | Nondirectional wave gage or measurement                                    |
| (P)      | Partial support  |

|     |  |
|-----|--|
| Puv | Combination pressure and current meter wave gage (directional) |
| RCP | Regional Coastal Processes Wave Transformation Model           |
| S   | Short duration gage (3 to 5 years)                             |
| SED | Sediment Transport Model                                       |
| SIO | Scripps Institution of Oceanography                            |
| Sxy | Radiation Stress, as measured by large slope array wave gage   |
| USN | US Navy  |
| WIS | Wave Information Study (hindcast)                              |

# **Section I**

## **Data Needs**

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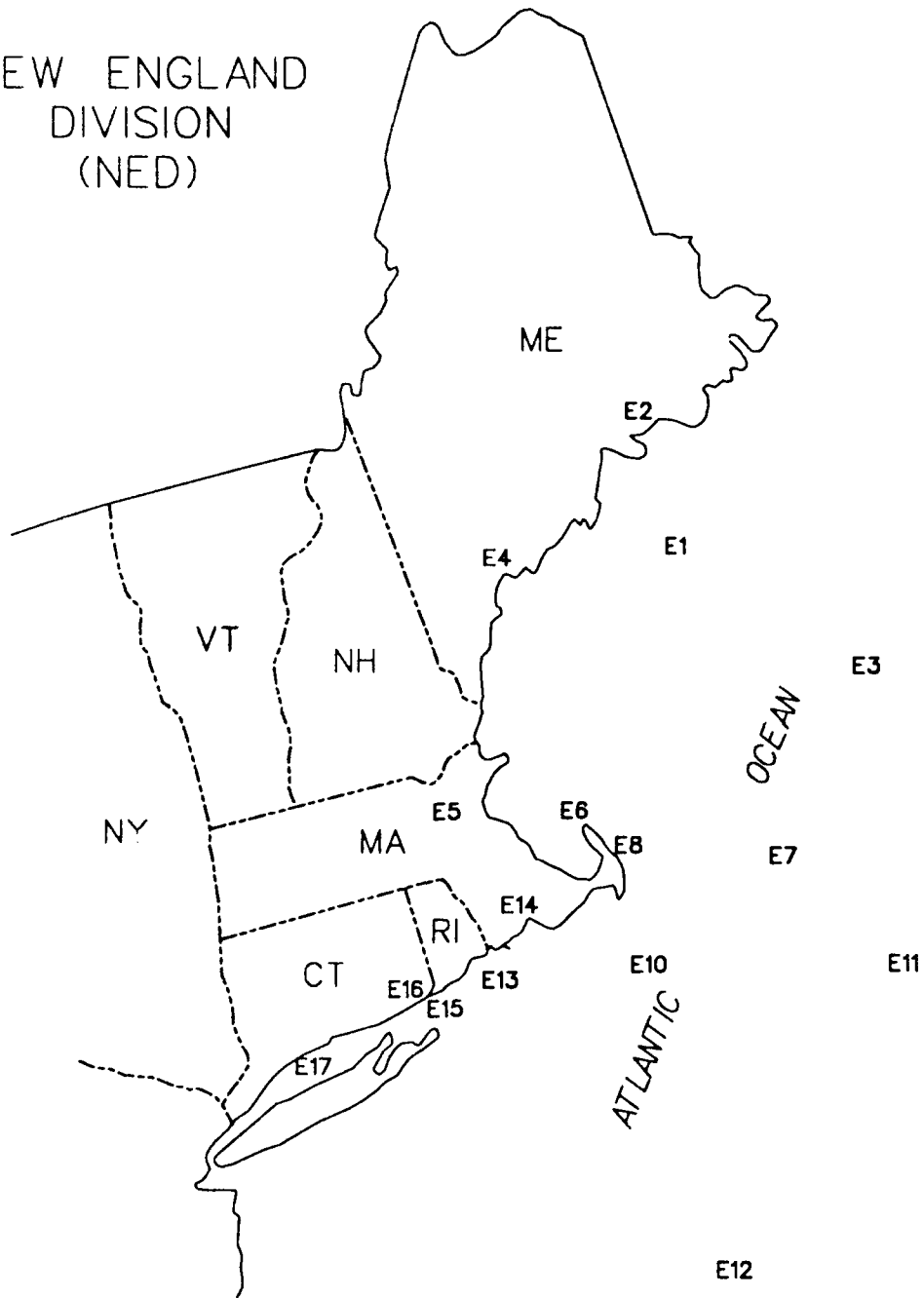


DIVISION

NCD

TOTALS

NEW ENGLAND  
DIVISION  
(NED)



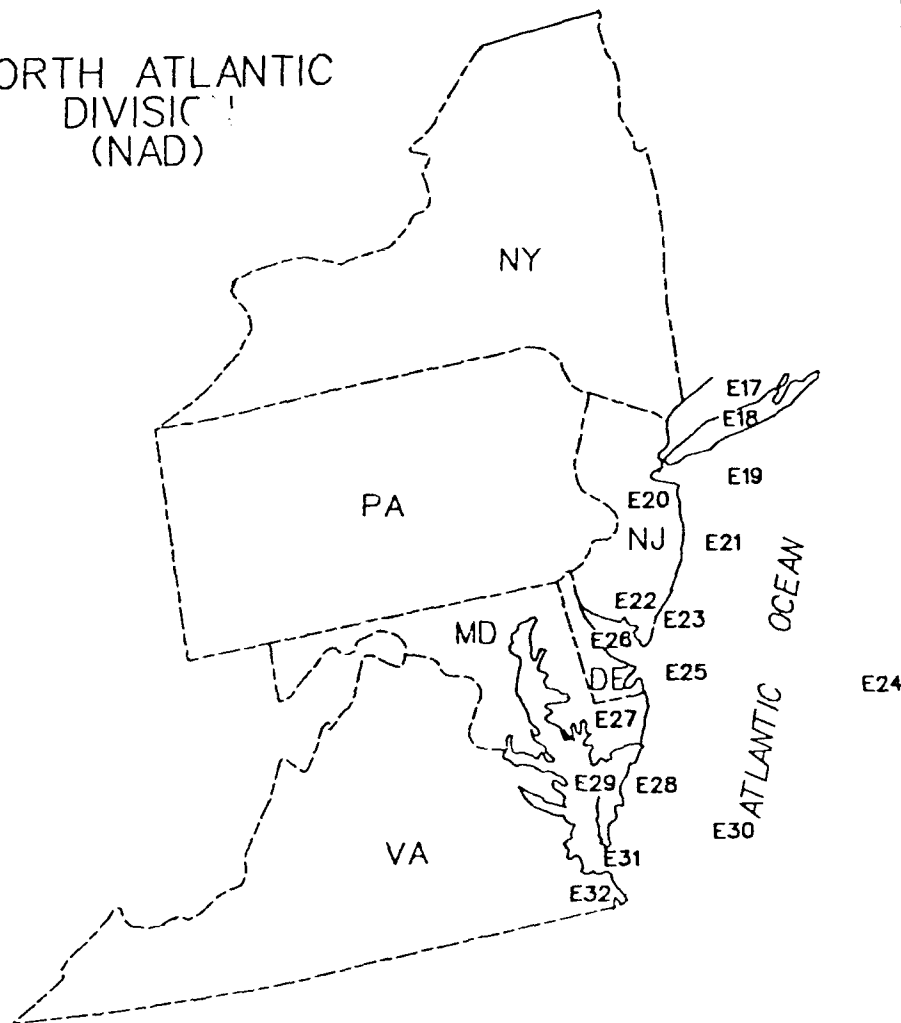


# FIELD WAVE GAGING - DATA NEEDS

DIVISION NED

| MAP<br>INDEX<br>NO. | AREA NAME          | HIGH PRIORITY | MED. PRIORITY | DURATION | DIR. WAVES<br>☐ | NONDIR. WAVES<br>○ | TIDES/WL<br>Σ | WINDS<br>⚡ | CURRENTS<br>↑ | OTHER   | EXISTING<br>GAGES |       |
|---------------------|--------------------|---------------|---------------|----------|-----------------|--------------------|---------------|------------|---------------|---|-------------------|-------|
|                     |                    |               |               |          |                 |                    |               |            |               |   | COE               | OTHER |
| E1                  | Grand Manan        | •             |               | L        | •               |                    |               | •          |               |   |                   |       |
| E2                  | Frenchman Bay      | •             |               | S        | •               |                    | •             | •          |               |   |                   |       |
| E3                  | Gulf of Maine      | •             |               | L        |                 |                    |               |            |               | NDBC buoy #44005-6N; non-directional          |                   | I     |
| E4                  | Saco Bay           |               | •             | S        | •               |                    | •             |            |               |   |                   |       |
| E5                  | Boston             | •             |               | S        | •               |                    | •             | •          |               | NDBC buoy #44013-LNB; non-directional         |                   | I     |
| E6                  | Provincetown       | •             |               | S        | •               |                    | •             |            |               |   |                   |       |
| E7                  | Cape Cod           | •             |               | L        | •               |                    |               | •          |               |   |                   |       |
| E8                  | Chatham            | •             |               | S        | •               |                    | •             |            |               |   |                   |       |
| E9                  | S. Cape Cod Shore  | •             |               | S        | •               |                    | •             | •          |               | Short term intensive gaging at multiple sites |                   |       |
| E10                 | Sankaty Head       |               | •             | S        | •               |                    |               | •          |               |   |                   |       |
| E11                 | Georges Bank       |               | •             | L        | •               |                    |               | •          |               | NDBC buoy #44011-6N; non-directional          |                   | I     |
| E12                 | Nantucket          | •             |               | L        |                 |                    |               |            |               | NDBC buoy #44008-LNB; non-directional         |                   | I     |
| E13                 | Martha's Vineyard  |               | •             | S        | •               |                    | •             | •          |               |   |                   |       |
| E14                 | Narragansett Bay   | •             |               | S        | •               |                    | •             | •          |               | Directional buoy + array needed               |                   |       |
| E15                 | Block Island Sound |               | •             | S        | •               |                    |               | •          |               |   |                   |       |
| E16                 | New London         | •             |               | S        | •               |                    | •             |            |               |   |                   |       |
|                     |                    |               |               |          |                 |                    |               |            |               |   |                   |       |
|                     |                    |               |               |          |                 |                    |               |            |               |   |                   |       |
|                     |                    |               |               |          |                 |                    |               |            |               |   |                   |       |
|                     |                    |               |               |          |                 |                    |               |            |               |   |                   |       |
|                     |                    |               |               |          |                 |                    |               |            |               |   |                   |       |
|                     |                    |               |               |          |                 |                    |               |            |               |   |                   |       |
|                     |                    |               |               |          |                 |                    |               |            |               |   |                   |       |
|                     |                    |               |               |          |                 |                    |               |            |               |   |                   |       |
|                     |                    |               |               |          |                 |                    |               |            |               |   |                   |       |
| TOTALS              |                    | 11            | 5             | -        |                 |                    |               |            |               |   |                   | 4     |

NORTH ATLANTIC  
DIVISION  
(NAD)

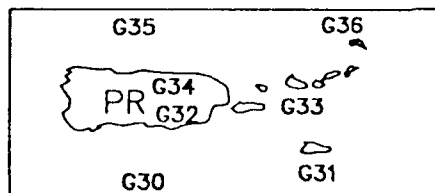
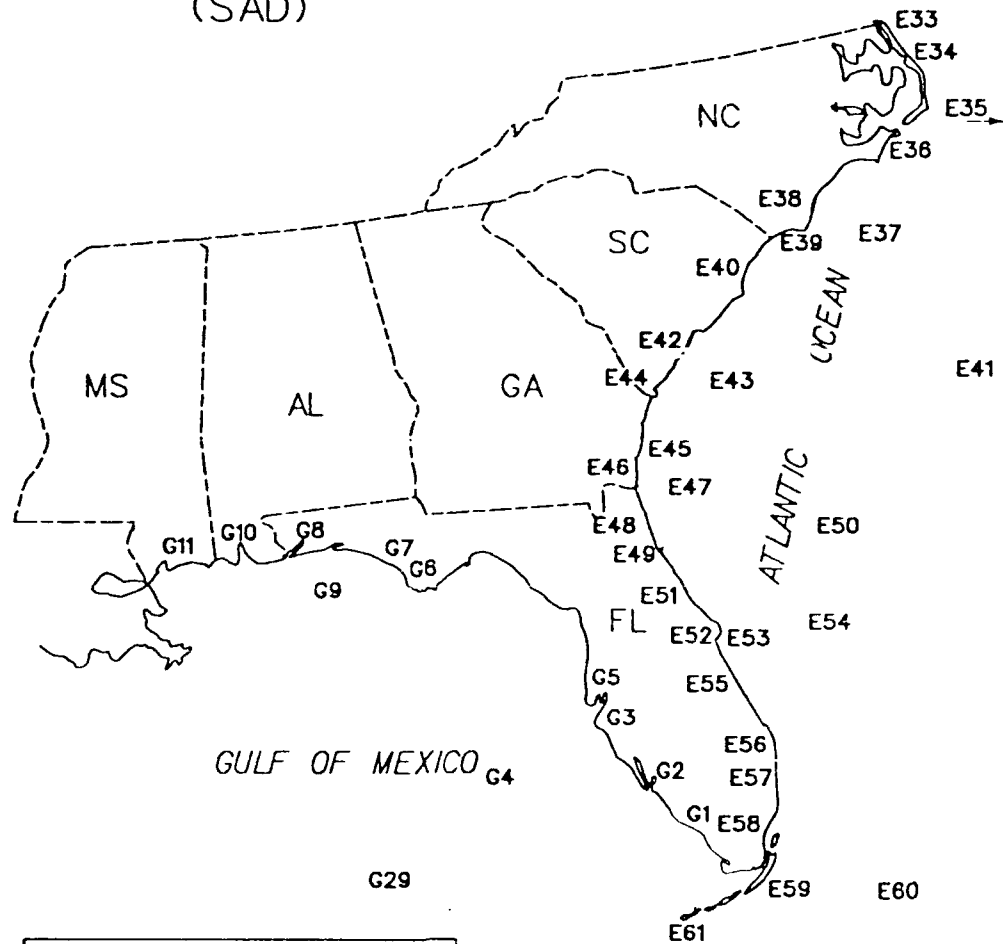


DIVISION NAD

| MAP<br>INDEX<br>NO. | AREA NAME                  | HIGH PRIORITY | MED. PRIORITY | DURATION | DIR. WAVES | NONDIR. WAVES | TIDES/WL | WINDS | CURRENTS | OTHER | COMMENTS                              | EXISTING GAGES |       |
|---------------------|----------------------------|---------------|---------------|----------|------------|---------------|----------|-------|----------|-------|---------------------------------------|----------------|-------|
|                     |                            |               |               |          |            |               |          |       |          |       |                                       | COE            | OTHER |
| E17                 | Long Island Sound          | •             |               | S        | •          |               |          | •     | •        |       | 2 locations for a dir. buoy           |                |       |
| E18                 | Long Island Shoreline      | •             |               | S        | •          |               | •        |       | •        |       | 5 sites identified                    |                |       |
| E19                 | Ambrose                    | •             |               | L        | •          |               |          | •     |          |       |                                       |                |       |
| E20                 | N. Jersey Shore            | •             |               | S        | •          |               | •        |       |          |       |                                       |                |       |
| E21                 | Barnegat Inlet             |               | •             | S        | •          |               | •        |       | •        |       |                                       |                |       |
| E22                 | Atlantic City              | •             |               | L        | •          |               | •        |       | •        |       |                                       |                |       |
| E23                 | Cape May                   | •             | •             | S        | •          |               | •        |       | •        |       |                                       |                |       |
| E24                 | Hotel                      | •             |               | L        | •          |               |          | •     |          |       | NDBC buoy #44004-6N; non-directional  |                | I     |
| E25                 | Delaware Bay Entrance      | •             |               | L        | •          |               |          | •     |          |       | NDBC buoy #44009-LNB; non-directional |                | I     |
| E26                 | Delaware Shore             | •             |               | S        | •          |               | •        |       | •        |       | Gage mount & cable in place           |                |       |
| E27                 | Ocean City                 | •             |               | S        | •          |               | •        |       |          |       | Co-operation w/Episodic Events        | 2              |       |
| E28                 | Chincoteague Inlet         | •             |               | S        | •          |               | •        |       |          |       |                                       |                |       |
| E29                 | Chesapeake Bay (A-K below) |               |               |          |            |               |          |       |          |       |                                       |                |       |
| E29-A               | Baltimore                  |               | •             | S        | •          | •             | •        | •     | •        |       |                                       |                |       |
| E29-B               | Chester River              | •             |               | S        |            | •             |          |       |          |       |                                       |                |       |
| E29-C               | Kent Island                |               | •             | S        | •          | •             | •        |       |          |       |                                       |                |       |
| E29-D               | Tilghman Island            | •             |               | S        | •          | •             | •        |       |          |       |                                       |                |       |
| E29-E               | Chaptank River             | •             |               | S        | •          | •             |          |       |          |       |                                       |                |       |
| E29-F               | Cambridge & VIC            |               | •             | S        | •          | •             | •        |       |          |       | Multiple sites                        |                |       |
| E29-G               | Calvert Cliffs             | •             |               | S        | •          |               | •        |       |          |       |                                       |                |       |
| E-29-H              | Potomac River              | •             |               | S        |            | •             |          |       |          |       |                                       |                |       |
| E29-I               | S. Potomac Shores          |               | •             | S        | •          | •             | •        |       |          |       | Multiple sites                        |                |       |
| TOTALS              |                            |               |               |          |            |               |          |       |          |       |                                       |                |       |



SOUTH ATLANTIC  
DIVISION  
(SAD)



DIVISION  
SAC

| MAP INDEX NO. | AREA NAME                    | HIGH PRIORITY | MED. PRIORITY | DURATION | DIR. WAVES | NONDIR. WAVES | TIDES/WL | WINDS | CURRENTS | OTHER | COMMENTS   | EXISTING GAGES |
|---------------|------------------------------|---------------|---------------|----------|------------|---------------|----------|-------|----------|-------|--|----------------|
| E30           | Duck                         | •             |               | L        | •          | •             | •        | •     | •        | •     | CERC Field Research Facility   | 9              |
| E31           | Oyster Inlet                 |               | •             | S        | •          |               | •        |       |          |       |  |                |
| E36           | East Hatteras                | •             |               | L        | •          |               |          | •     |          |       | NDBC buoy #41007-8N; non-directional   |                |
| E39           | Beaufort                     | •             |               | S        | •          |               | •        |       |          |       |  |                |
| E37           | North Carolina Light         | •             |               | L        | •          |               |          | •     |          |       |  |                |
| E38           | Wilmington                   | •             |               | S        | •          |               | •        |       |          |       |  |                |
| E39           | Jettie River Inlet           | •             |               | S        | •          |               | •        |       |          |       |  |                |
| E40           | Martins Inlet                | •             |               | S        | •          |               | •        |       |          |       |  |                |
| E41           | South Hatteras               |               | •             | L        | •          |               |          | •     |          |       | NDBC buoy #41010-40D; non-directional  |                |
| E42           | Ferry Island                 | •             |               | S        | •          |               | •        |       |          |       |  |                |
| E43           | South Ocracoke Light         | •             |               | L        | •          |               |          | •     |          |       |  |                |
| E44           | Vine Island                  | •             |               | S        | •          |               | •        |       |          |       |  |                |
| E45           | St. Simons Island            | •             |               | S        | •          |               | •        |       |          |       |  |                |
| E46           | Cumberland/Greenville Island | •             |               | S        | •          |               | •        |       |          |       | Data available from Kings Bay Study  | 3              |
| E47           | St. Marys Entrance           | •             |               | S        | •          |               |          | •     |          |       | NDBC buoy #41008-30A; directional  | 3              |
| E48           | Jacksonville                 | •             |               | L        | •          |               | •        |       | •        |       |  |                |
| E49           | Flagler                      |               | •             | S        | •          |               | •        |       |          |       |  |                |
| E50           | East Daytona                 |               | •             | L        | •          |               |          | •     |          |       | NDBC buoy #41006-6N; non-directional   |                |
| E51           | Ponce de Leon Inlet          | •             |               | S        | •          |               | •        |       |          |       |  |                |
| E52           | Port Canaveral               |               | •             | S        | •          |               | •        |       |          |       |  | 1              |
| E53           | Cape Canaveral               | •             |               | L        | •          |               |          | •     |          |       | NDBC buoy #41009-50I; non-directional<br>upgrade to Invest Gulf Stream effects |                |
| <b>TOTALS</b> |                              |               |               |          |            |               |          |       |          |       |  |                |

DIVISION  
SAD

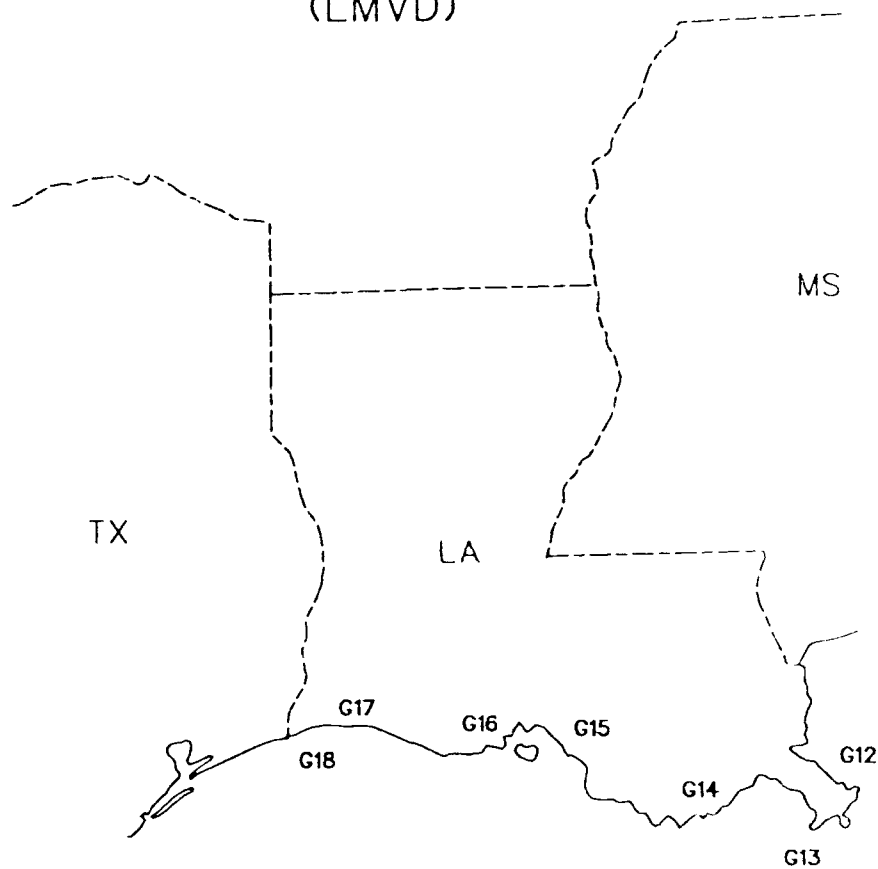
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|---------------|--------------------|---------------|---------------|----------|------------|---------------|----------|-------|----------|-------|---------------------------------------|----------------|-------|
|               |                    |               |               |          |            |               |          |       |          |       |                                       | CCE            | OTHER |
| E54           | Canaveral East     | •             | •             | S        | •          | •             | •        | •     |          |       | NDBC buoy #4000-100; non-directional  |                | 1     |
| E55           | Ft. Pierce         | •             | •             | S        | •          | •             | •        |       |          |       | upgrade to Invest Gulf Stream effects |                |       |
| E56           | West Palm Beach    | •             | •             | S        | •          | •             | •        |       |          |       |                                       | 2              |       |
| E57           | Ft. Lauderdale     | •             | •             | S        | •          | •             | •        |       |          |       |                                       | 1              |       |
| E58           | Miami              | •             | •             | L        | •          | •             | •        |       |          |       |                                       | 1              |       |
| E59           | North Keys         | •             | •             | S        | •          | •             | •        |       |          |       |                                       |                |       |
| E60           | Florida Straits    | •             | •             | L        | •          | •             | •        |       |          |       |                                       |                |       |
| E61           | Key West           | •             | •             | S        | •          | •             | •        |       |          |       |                                       |                |       |
|               |                    |               |               |          |            |               |          |       |          |       |                                       |                |       |
| G1            | Naples             | •             | •             | S        | •          | •             | •        |       |          |       |                                       |                |       |
| G2            | Sanibel Island     | •             | •             | S        | •          | •             | •        |       |          |       |                                       |                |       |
| G3            | Venice             | •             | •             | S        | •          | •             | •        |       |          |       |                                       | 1              |       |
| G4            | Tampa Offshore     | •             | •             | L        | •          | •             | •        |       |          |       |                                       |                |       |
| G5            | Clearwater         | •             | •             | S        | •          | •             | •        |       |          |       |                                       | 1              |       |
| G6            | Panama City        | •             | •             | S        | •          | •             | •        |       |          |       |                                       |                |       |
| G7            | East Pass          | •             | •             | S        | •          | •             | •        |       |          |       |                                       | 1              |       |
| G8            | Pensacola          | •             | •             | S        | •          | •             | •        |       |          |       |                                       |                |       |
| G9            | Pensacola Offshore | •             | •             | L        | •          | •             | •        |       |          |       |                                       |                |       |
| G10           | Mobile             | •             | •             | S        | •          | •             | •        |       |          |       | DRP                                   | 3              |       |
| G11           | Mississippi Coast  | •             | •             | S        | •          | •             | •        |       |          |       | Several sites for one gage            |                | 1     |
| G29           | Eastern Gulf       | •             | •             | L        | •          | •             | •        |       |          |       | NDBC buoy #42003-100; non-directional |                | 1     |
| TOTALS        |                    |               |               |          |            |               |          |       |          |       |                                       |                |       |

DIVISION

TOTALS



LOWER MISSISSIPPI  
VALLEY DIVISION  
(LMVD)



GULF OF MEXICO

G28

# FIELD WAVE GAGING - DATA NEEDS

DIVISION

WWD

| MAP INDEX NO. | AREA NAME              | PRIORITY |      |     |       |       | DURATION | WAVE TYPES |       |       |       |       | CURRENTS | OTHER | EXISTING GAGES |
|---------------|------------------------|----------|------|-----|-------|-------|----------|------------|-------|-------|-------|-------|----------|-------|----------------|
|               |                        | HIGH     | MED. | LOW | WINDS | WINDS |          | WINDS      | WINDS | WINDS | WINDS | WINDS |          |       |                |
| 00            | Mississippi River Gulf |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 01            | St. Louis, Miss. River |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 02            | Grand Gulf             |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 03            | Atchafalaya Bay        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 04            | Freshwater Bay         |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 05            | Calcasieu              |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 06            | Sabine Pass            |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 07            | Central Gulf           |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 08            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 09            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 10            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 11            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 12            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 13            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 14            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 15            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 16            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 17            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 18            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 19            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 20            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 21            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 22            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 23            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 24            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 25            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 26            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 27            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 28            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 29            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 30            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 31            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 32            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 33            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 34            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 35            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 36            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 37            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 38            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 39            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 40            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 41            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 42            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 43            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 44            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 45            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 46            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 47            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 48            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 49            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 50            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 51            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 52            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 53            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 54            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 55            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 56            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 57            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 58            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 59            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 60            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 61            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 62            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 63            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 64            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 65            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 66            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 67            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 68            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 69            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 70            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 71            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 72            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 73            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 74            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 75            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 76            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 77            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 78            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 79            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 80            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 81            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 82            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 83            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 84            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 85            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 86            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 87            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 88            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 89            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 90            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 91            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 92            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 93            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 94            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 95            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 96            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 97            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 98            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 99            |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |
| 100           |                        |          |      |     |       |       |          |            |       |       |       |       |          |       |                |

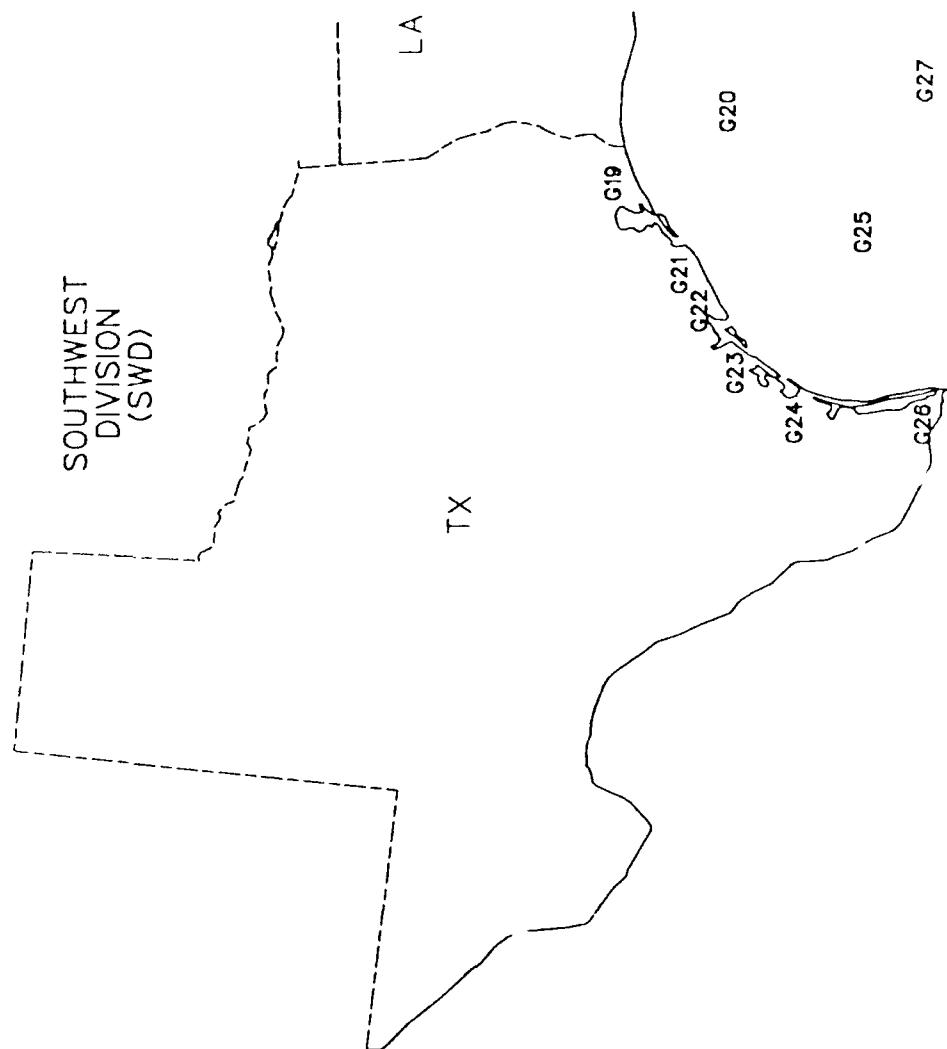
TOTALS

4

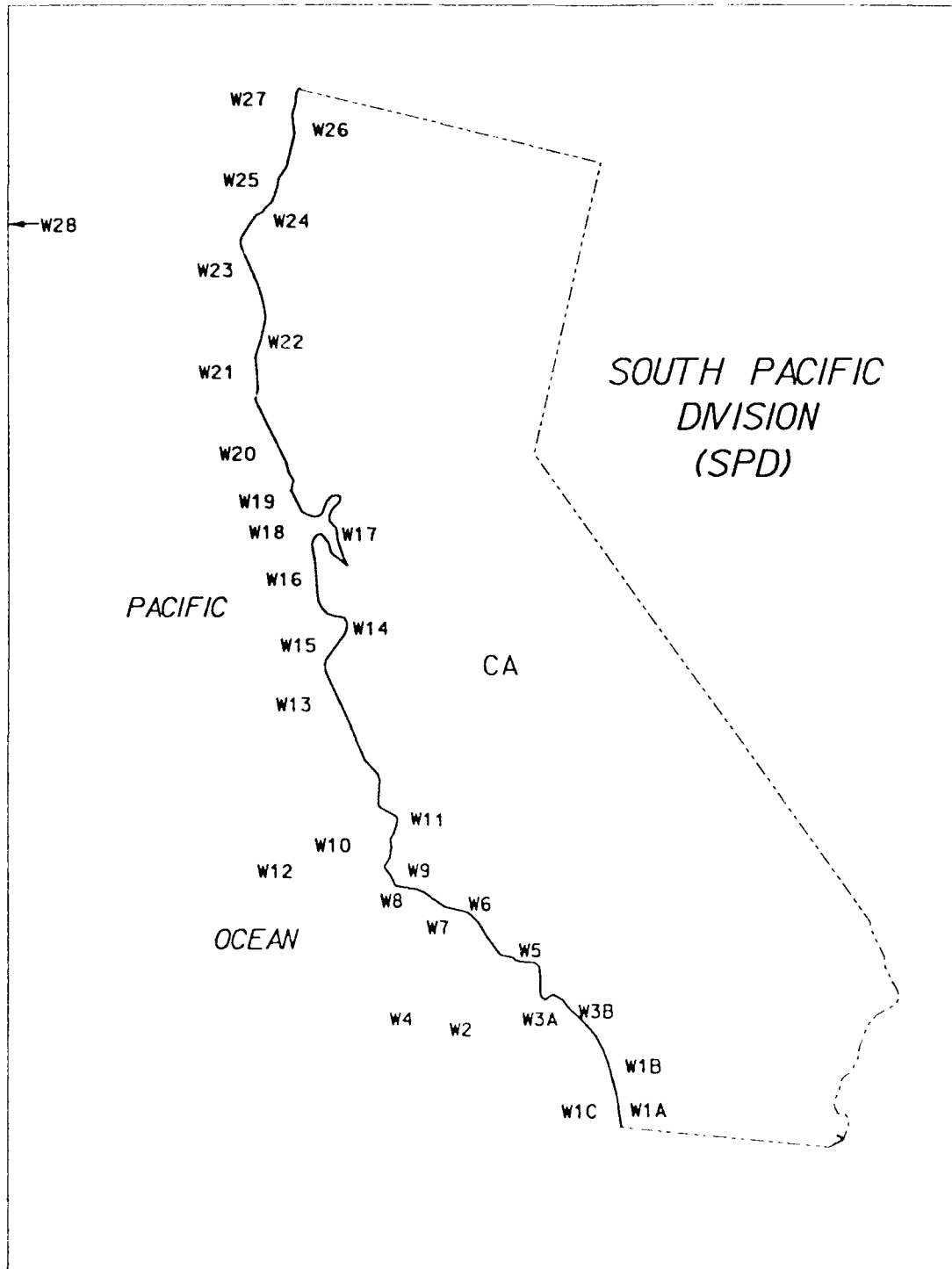
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2







# FIELD WAVE GAGING - DATA NEEDS

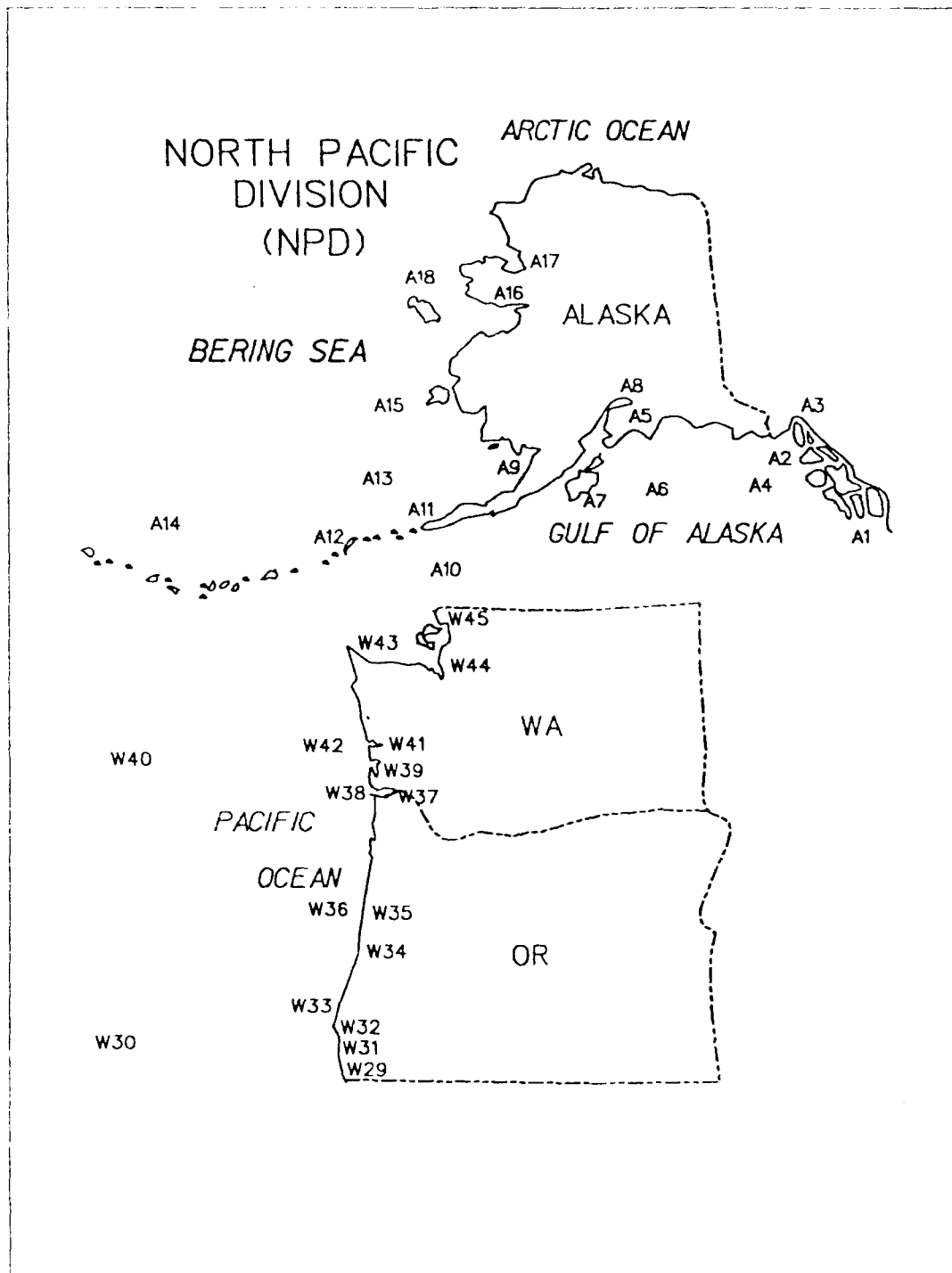
DIVISION SPD

| MAP<br>INDEX<br>NO. | AREA NAME              | HIGH PRIORITY | MED. PRIORITY | DURATION | DIR. WAVES<br>☉ | NONDIR. WAVES<br>○ | TIDES/WL<br>Σ | WINDS<br>⚡ | CURRENTS<br>↑ | OTHER | COMMENTS  | EXISTING<br>GAGES |       |
|---------------------|------------------------|---------------|---------------|----------|-----------------|--------------------|---------------|------------|---------------|-------|---|-------------------|-------|
|                     |                        |               |               |          |                 |                    |               |            |               |       |   | COE               | OTHER |
| W1-A                | San Diego              | •             | •             | S        | •               | •                  | •             | •          | •             | •     | Potential co-op w/o O&M, SPD: Significant data base exists from 3 sites | 2                 |       |
| W1-B                | Oceanside              | •             | •             | S        |                 |                    |               |            |               |       | Significant database exists from 3 sites                                | 2                 |       |
| W1-C                | San Pedro Channel      | •             | •             | L        | •               |                    |               | •          |               |       | Provide Southern Swell effect on South.                                 |                   |       |
|                     |                        |               |               |          |                 |                    |               |            |               |       | California  |                   |       |
| W2                  | Catalina Ridge         | •             | •             | L        | •               |                    |               | •          |               |       | NDBC buoy #46025-3D: directional  | (2)               | 1     |
|                     |                        |               |               |          |                 |                    |               |            |               |       | Co-op w/MCCP Redondo Beach work unit                                    |                   |       |
| W3-A                | San Pedro Bay          | •             | •             | S        | •               | •                  | •             | •          |               |       | Potential co-op w/SPD and Ports of LA/LB                                | 1                 |       |
| W3-B                | Redondo Beach          | •             | •             | S        | •               | •                  | •             | •          |               |       | Co-op w/MCCP Redondo Beach work unit                                    |                   |       |
| W4                  | South California Bight | •             | •             | L        | •               |                    |               | •          |               |       | Co-op w/USN   | (2)               | 1     |
| W5                  | Santa Monica           | •             | •             | S        | •               | •                  | •             |            |               |       |   |                   |       |
| W6                  | Santa Barbara          | •             | •             | S        | •               | •                  | •             |            |               |       |   |                   |       |
| W7                  | Santa Cruz Canyon      | •             | •             | S        | •               | •                  |               |            |               |       | Navy owned, COE operated  | 1                 |       |
| W8                  | Point Conception       | •             | •             | L        | •               |                    |               | •          |               |       | NDBC buoy #46023-10D: non-directional                                   |                   | 1     |
| W9                  | Point Arguello         | •             | •             | S        | •               |                    |               | •          |               |       | Non-directional gage on Harvest Platform                                | 1                 |       |
| W10                 | Santa Maria            | •             | •             | S        | •               |                    |               | •          |               |       | NDBC buoy #46011-6N non-directional                                     |                   |       |
| W11                 | Marro Bay              | •             | •             | S        | •               | •                  | •             |            |               |       | S10 buoy at Diablo Canyon: non-directional                              | 1                 |       |
|                     |                        |               |               |          |                 |                    |               |            |               |       | 2 g-ges required  |                   |       |
| W12                 | Pt. Buchon             | •             | •             | S        | •               |                    |               | •          |               |       |   |                   |       |
| W13                 | Cape San Martin        | •             | •             | S        | •               |                    |               | •          |               |       | NDBC buoy #46028-6N: non-directional                                    |                   | 1     |
| W14                 | Monterey Bay           | •             | •             | S        | •               | •                  | •             |            |               |       |   | 2                 |       |
| W15                 | Monterey Offshore      | •             | •             | L        | •               |                    |               | •          |               |       | NDBC buoy #46042-3D: directional  |                   |       |

TOTALS

## DIVISION

TOTALS





NCIS/AVIC

NP0

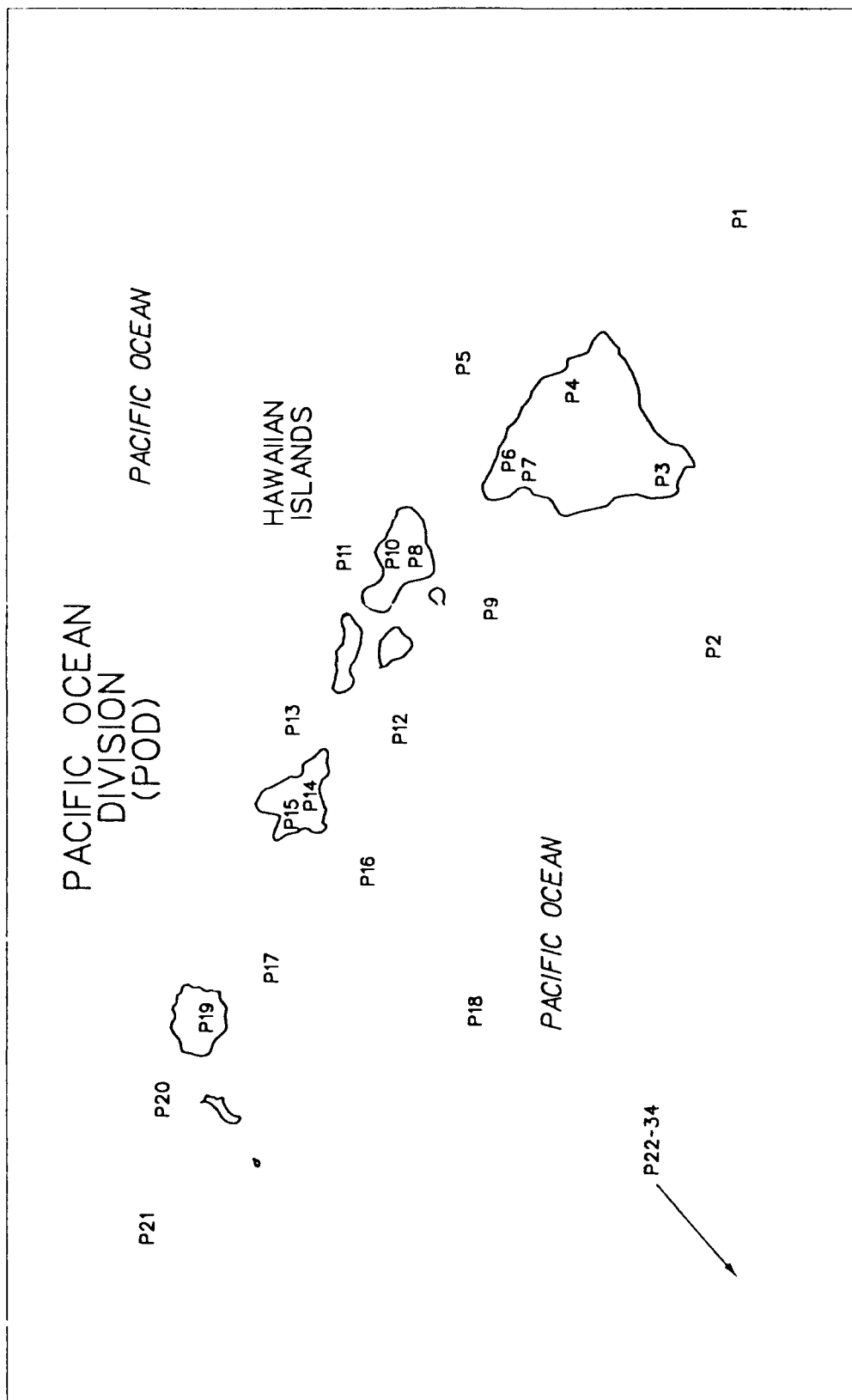
CdN

| MAP INDEX NO. | AREA NAME               | HIGH PRIORITY | MED. PRIORITY | DURATION | DIR. WAVES | NONDIR. WAVES | TIDES/WL | WINDS | CURRENTS | OTHER | COMMENTS                                    | EXISTING GAGES |       |
|---------------|-------------------------|---------------|---------------|----------|------------|---------------|----------|-------|----------|-------|---|----------------|-------|
|               |                         |               |               |          |            |               |          |       |          |       |   | COE            | OTHER |
| W29           | Cape Sebastian          |               |               | S        | •          |               | •        |       |          |       |   |                |       |
| W30           | Oregon                  |               |               | L        | •          |               |          | •     |          |       | NDBC buoy #46002-6N; non-directional        |                | 1     |
| W31           | Coquille                | •             |               | S        | •          |               | •        |       |          |       |   | 2              |       |
| W32           | Coos Bay                | •             |               | S        | •          |               | •        |       |          |       |   |                |       |
| W33           | Cape Arago              | •             |               | L        | •          |               |          | •     |          |       | S10 buoy at Coquille; non-directional       | 1              |       |
| W34           | Siuslaw                 | •             |               | S        | •          | •             |          | •     |          |       | Coop w/MCCP Program planned                 | 1              |       |
| W35           | Yaquina                 | •             |               | S        | •          | •             | •        | •     |          |       | Coop w/MCCP Program planned; multiple gages |                |       |
| W36           | Cape Faulweather        |               | •             | L        | •          |               |          | •     |          |       | NDBC buoy #46040-3D; non-directional        |                | 1     |
| W37           | Columbia River entrance | •             |               | L        | •          |               | •        | •     |          |       | Need gages on both sides of entrance        | 1              |       |
| W38           | Columbia River Offshore | •             |               | L        | •          |               |          | •     |          |       | NDBC buoy #46010-LNB; non-directional       |                | 1     |
| W39           | Willapa Bay             |               | •             | S        | •          |               | •        | •     |          |       |   |                |       |
| W40           | Washington              | •             |               | L        | •          |               |          | •     |          |       | NDBC buoy #46005-6N; non-directional        |                | 1     |
| W41           | Grays Harbor            | •             |               | S        | •          |               | •        | •     |          |       |   |                |       |
| W42           | Grays Harbor Offshore   | •             |               | L        | •          |               |          | •     |          |       | Replace waverider w/upgraded NDBC           | 1              | 1     |
| W43           | Strait of Juan de Fuca  |               | •             | L        | •          | •             |          | •     |          |       |   |                | 1     |
| W44           | Seattle                 | •             |               | S        | •          | •             |          | •     |          |       |   |                |       |
| W45           | San Juan Islands        | •             |               | S        | •          | •             |          | •     |          |       |   |                |       |
|               |                         |               |               |          |            |               |          |       |          |       |   |                |       |
| A1            | Ketchikan               | •             |               | S        | •          | •             |          | •     |          |       |   |                |       |
| A2            | Sitka                   | •             |               | S        | •          | •             |          | •     |          |       | Multiple gages required                     |                |       |
| A3            | Lynn Canal              |               | •             | S        | •          | •             |          | •     |          |       |   |                |       |
| A4            | Southeast Alaska        | •             |               | L        | •          | •             |          | •     |          |       |   |                |       |
| TOTALS        |                         |               |               |          |            |               |          |       |          |       |   |                |       |

# FIELD WAVE GAGING - DATA NEEDS

DIVISION NPD

| MAP INDEX NO. | AREA NAME | HIGH PRIORITY | MED. PRIORITY | DURATION | DIR. WAVES | NONDIR. WAVES | TIDES/WL | WINDS | CURRENTS | OTHER | EXISTING GAGES |       |
|---------------|-----------|---------------|---------------|----------|------------|---------------|----------|-------|----------|-------|----------------|-------|
|               |           |               |               |          |            |               |          |       |          |       | COE            | OTHER |
| A5            | Forward   |               |               | 5        |            |               |          |       |          |       |                |       |
| A6            | North Arm |               |               | 5        |            |               |          |       |          |       |                |       |
| A7            | North     |               |               | 5        |            |               |          |       |          |       |                |       |
| A8            | Rocky Pt  |               |               | 5        |            |               |          |       |          |       |                |       |
| A9            | Bay       |               |               | 5        |            |               |          |       |          |       |                |       |
| A10           | South     |               |               | 5        |            |               |          |       |          |       |                |       |
| A11           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A12           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A13           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A14           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A15           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A16           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A17           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A18           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A19           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A20           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A21           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A22           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A23           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A24           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A25           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A26           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A27           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A28           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A29           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A30           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A31           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A32           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A33           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A34           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A35           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A36           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A37           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A38           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A39           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A40           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A41           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A42           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A43           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A44           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A45           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A46           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A47           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A48           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A49           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A50           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A51           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A52           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A53           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A54           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A55           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A56           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A57           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A58           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A59           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A60           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A61           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A62           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A63           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A64           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A65           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A66           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A67           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A68           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A69           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A70           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A71           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A72           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A73           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A74           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A75           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A76           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A77           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A78           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A79           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A80           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A81           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A82           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A83           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A84           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A85           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A86           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A87           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A88           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A89           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A90           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A91           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A92           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A93           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A94           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A95           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A96           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A97           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A98           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A99           | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| A100          | Point     |               |               | 5        |            |               |          |       |          |       |                |       |
| TOTALS        |           | 20            | 15            | -        |            |               |          |       |          |       | 7              | 10    |



POD DIVISION

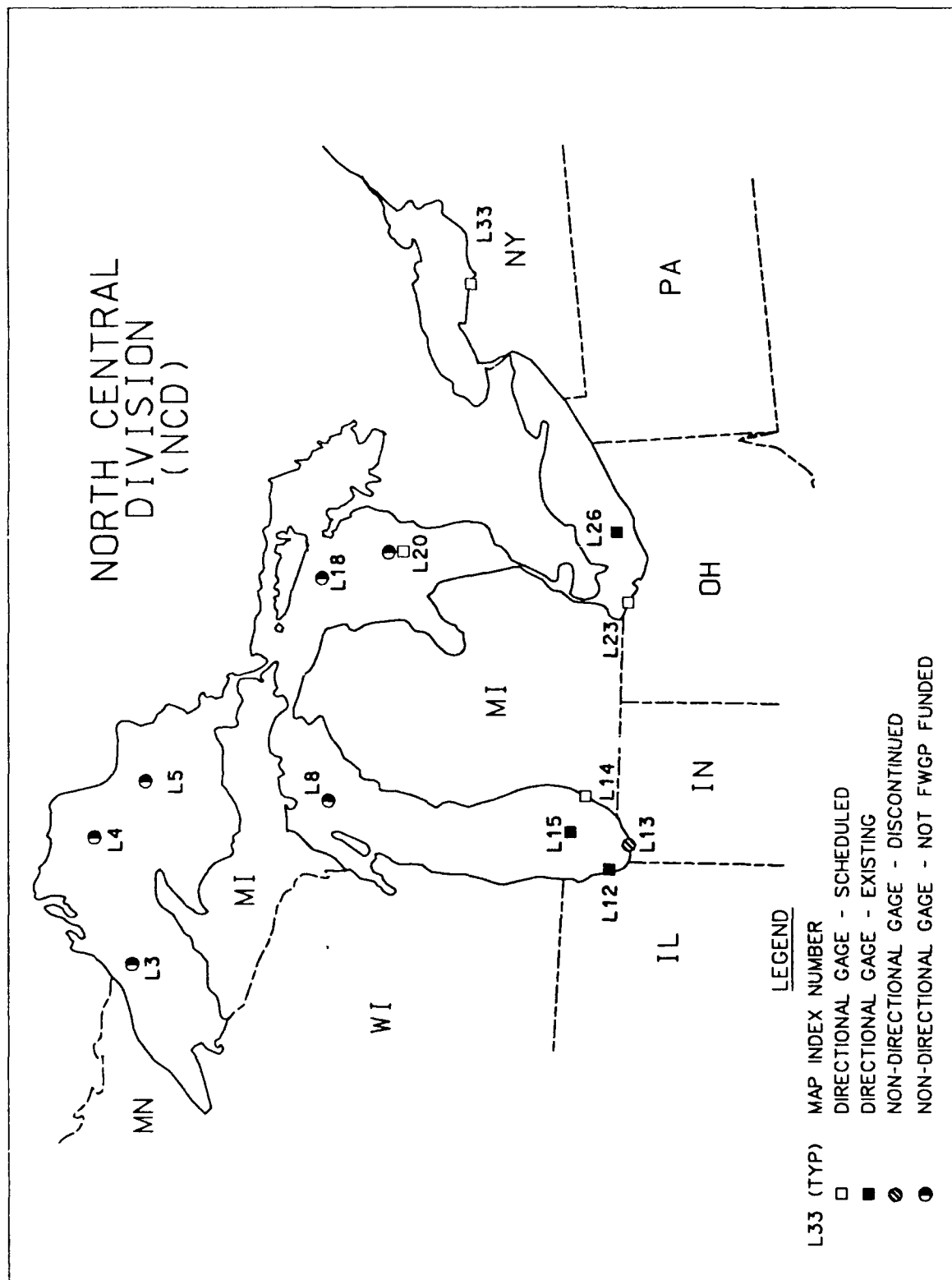
| MAP INDEX NO. | AREA NAME                  | HIGH PRIORITY | MED. PRIORITY | DURATION | DIR. WAVES | NONDIR. WAVES | TIDES/WL | WINDS | CURRENTS | OTHER | COMMENTS                             | EXISTING GAGES |       |
|---------------|----------------------------|---------------|---------------|----------|------------|---------------|----------|-------|----------|-------|--------------------------------------|----------------|-------|
|               |                            |               |               |          |            |               |          |       |          |       |                                      | COE            | OTHER |
| P1            | South East Hawaii          |               |               |          |            |               |          |       |          |       | NDBC buoy #51004-6N; non-directional |                |       |
| P2            | South West Hawaii          |               |               |          |            |               |          |       |          |       | NDBC buoy #51002-6N; non-directional |                |       |
| P3            | Ka Lae                     |               |               | S        |            |               |          |       |          |       |                                      |                |       |
| P4            | Hilo                       |               |               | S        |            |               |          |       |          |       |                                      |                |       |
| P5            | Hawaii Offshore, Northeast |               |               | L        |            |               |          |       |          |       |                                      |                |       |
| P6            | Hawaii, North              |               |               | S        |            |               |          |       |          |       |                                      |                |       |
| P7            | Kauai                      |               |               | S        |            |               |          |       |          |       |                                      |                |       |
| P8            | Hawaii West                |               |               | L        |            |               |          |       |          |       |                                      |                |       |
| P9            | MauI Southwest             |               |               | S        |            |               |          |       |          |       |                                      |                |       |
| P10           | Kahului Harbor             |               |               | S        |            |               |          |       |          |       |                                      |                |       |
| P11           | MauI Offshore, North       |               |               | L        |            |               |          |       |          |       |                                      |                |       |
| P12           | Molokai Offshore, South    |               |               | L        |            |               |          |       |          |       |                                      |                |       |
| P13           | Oahu Northeast             |               |               | L        |            |               |          |       |          |       | Waverider at Makapu; non-directional |                |       |
| P14           | Honolulu                   |               |               | S        |            |               |          |       |          |       |                                      |                |       |
| P15           | Barbers Point              |               |               | S        |            |               |          |       |          |       | Gages in place under MSCP program    |                |       |
| P16           | Oahu South                 |               |               | L        |            |               |          |       |          |       |                                      |                |       |
| P17           | Kaula Channel              |               |               | L        |            |               |          |       |          |       | NDBC buoy #51003-6N; non-directional |                |       |
| P18           | West Hawaii                |               |               | L        |            |               |          |       |          |       |                                      |                |       |
| P19           | Lihue                      |               |               | S        |            |               |          |       |          |       |                                      |                |       |
| P20           | Barking Sands              |               |               | L        |            |               |          |       |          |       | Continue coop w/USN                  |                |       |
| P21           | North West Hawaii          |               |               | L        |            |               |          |       |          |       | NDBC buoy #51001-6N; non-directional |                |       |
|               |                            |               |               |          |            |               |          |       |          |       |                                      |                |       |
| TOTALS        |                            |               |               |          |            |               |          |       |          |       |                                      |                |       |



## **Section II**

# **Deployment Plan**

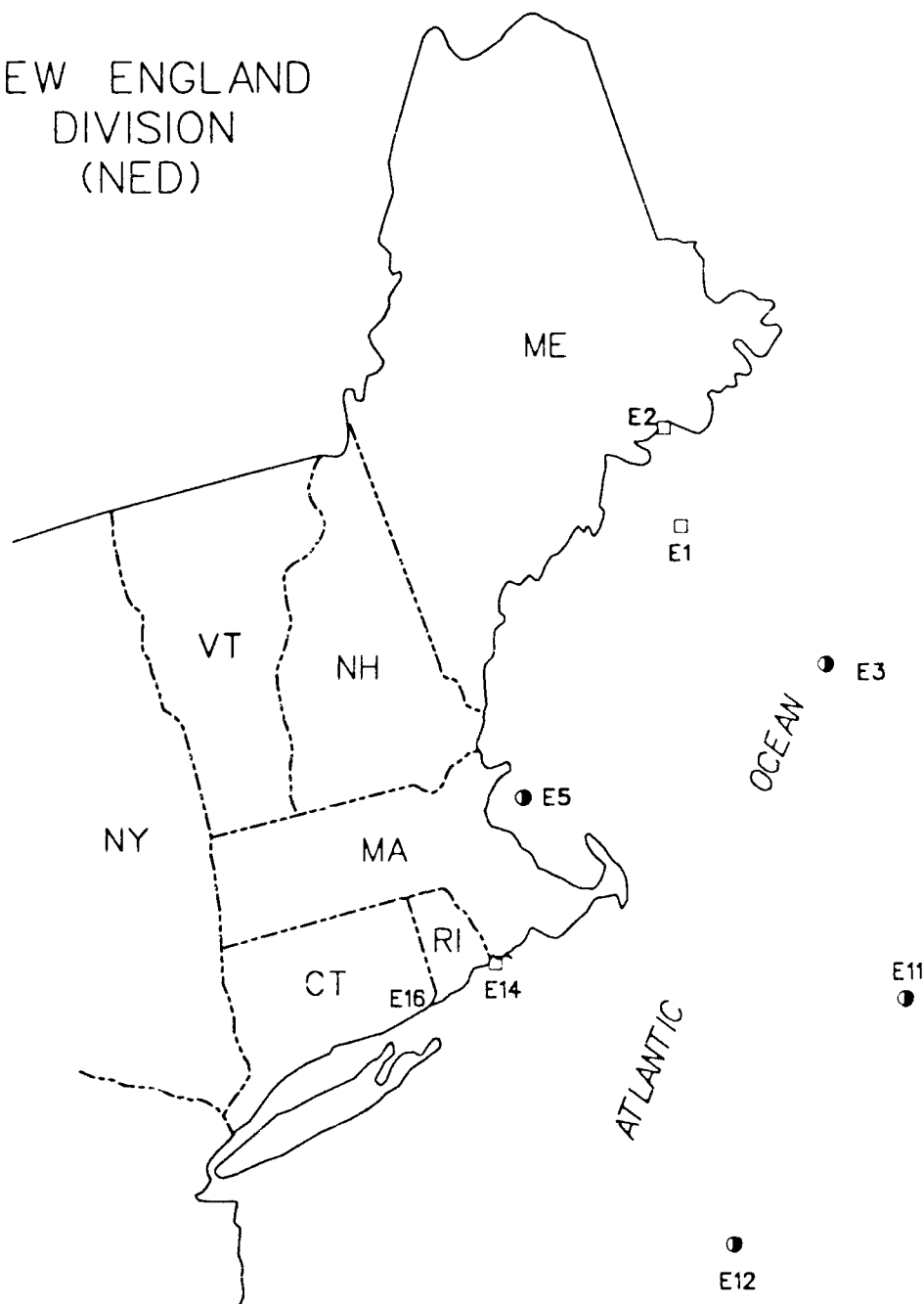
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NEW ENGLAND  
DIVISION  
(NED)



LEGEND

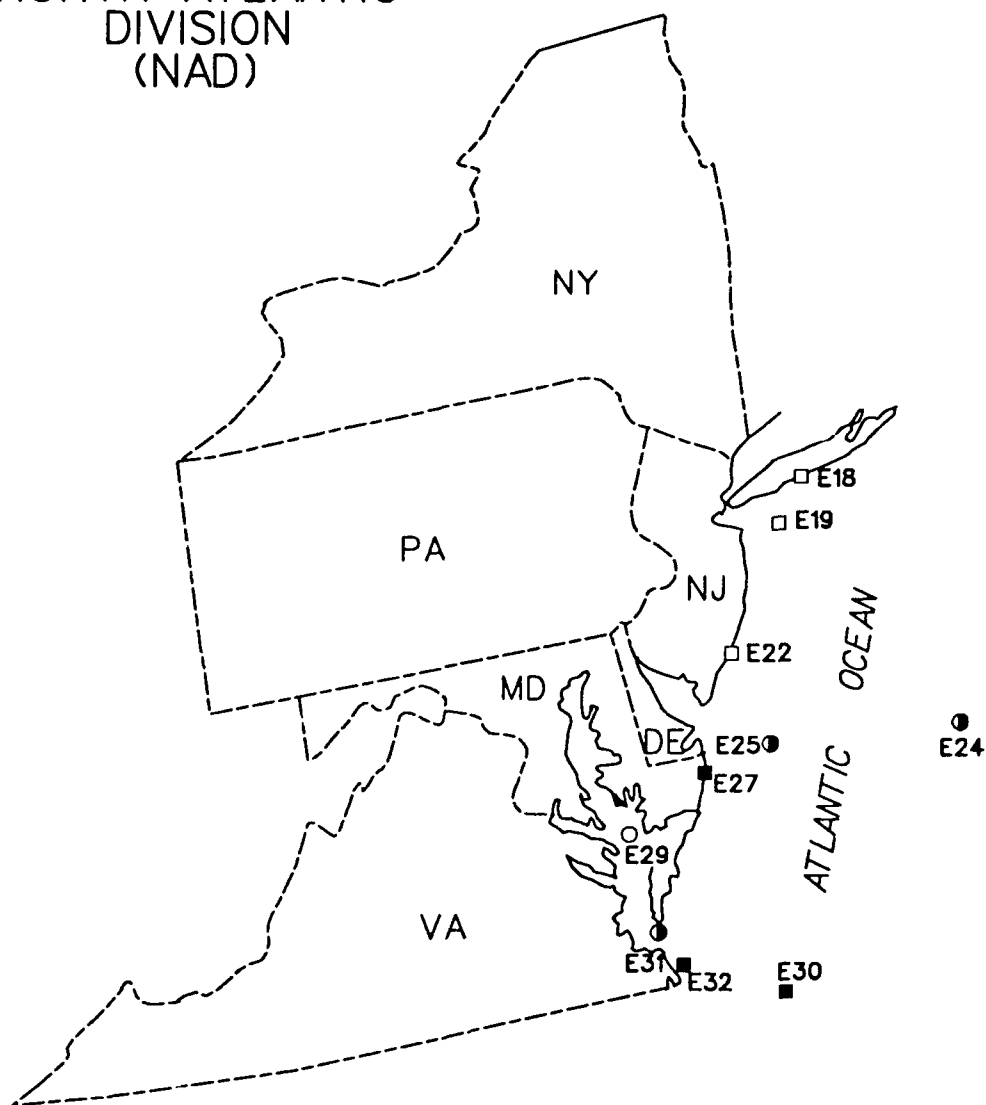
E16 (TYP) MAP INDEX NUMBER  
 □ DIRECTIONAL GAGE - SCHEDULED  
 ● NON-DIRECTIONAL GAGE - NOT FWGP FUNDED

# FIELD WAVE GAGING PROGRAM - GAGE DEPLOYMENT PLAN

DIVISION NED

| MAP<br>INDEX<br>NO. | AREA NAME        | DATA NEEDS |               |          |       |          |       | MODEL<br>VERIFICATION |  | GAGE STATUS        |                    |              | GAGE DEPLOYMENT |         |         |      | COMMENTS |
|---------------------|------------------|------------|---------------|----------|-------|----------|-------|-----------------------|--|--------------------|--------------------|--------------|-----------------|---------|---------|------|----------|
|                     |                  | DIR. WAVES | NONDIR. WAVES | TIDES/WL | WINDS | CURRENTS | OTHER |                       |  | GAGE<br>YEARS<br>⊙ | GAGE<br>YEARS<br>⊗ | CFY<br>YEARS | BFY             | FY      | FY      | FY   |          |
| E1                  | Grand Manan      | •          |               |          | •     |          |       | WIS                   |  | 0                  | 0                  |              | //              | ////    | ////    | //// |          |
| E2                  | Frenchmans Bay   | •          |               | •        | •     |          |       | WIS<br>RCP            |  | 0                  | 0                  |              |                 | XX XXXX | XX XXXX | XXXX |          |
| E14                 | Narragansett Bay | •          |               | •        | •     |          |       | WIS<br>RCP            |  | 0                  | 0                  |              |                 | XX XXXX |         |      |          |
|                     |                  |            |               |          |       |          |       |                       |  |                    |                    |              |                 |         |         |      |          |
|                     |                  |            |               |          |       |          |       |                       |  |                    |                    |              |                 |         |         |      |          |
|                     |                  |            |               |          |       |          |       |                       |  |                    |                    |              |                 |         |         |      |          |
|                     |                  |            |               |          |       |          |       |                       |  |                    |                    |              |                 |         |         |      |          |
|                     |                  |            |               |          |       |          |       |                       |  |                    |                    |              |                 |         |         |      |          |
|                     |                  |            |               |          |       |          |       |                       |  |                    |                    |              |                 |         |         |      |          |
|                     |                  |            |               |          |       |          |       |                       |  |                    |                    |              |                 |         |         |      |          |
|                     |                  |            |               |          |       |          |       |                       |  |                    |                    |              |                 |         |         |      |          |
|                     |                  |            |               |          |       |          |       |                       |  |                    |                    |              |                 |         |         |      |          |
| TOTALS              |                  |            |               |          |       |          |       |                       |  | 0                  | 0                  | 0            | 1               | 2       | 3       | 3    |          |

# NORTH ATLANTIC DIVISION (NAD)

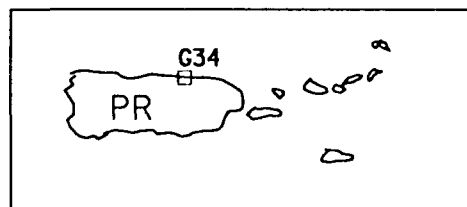
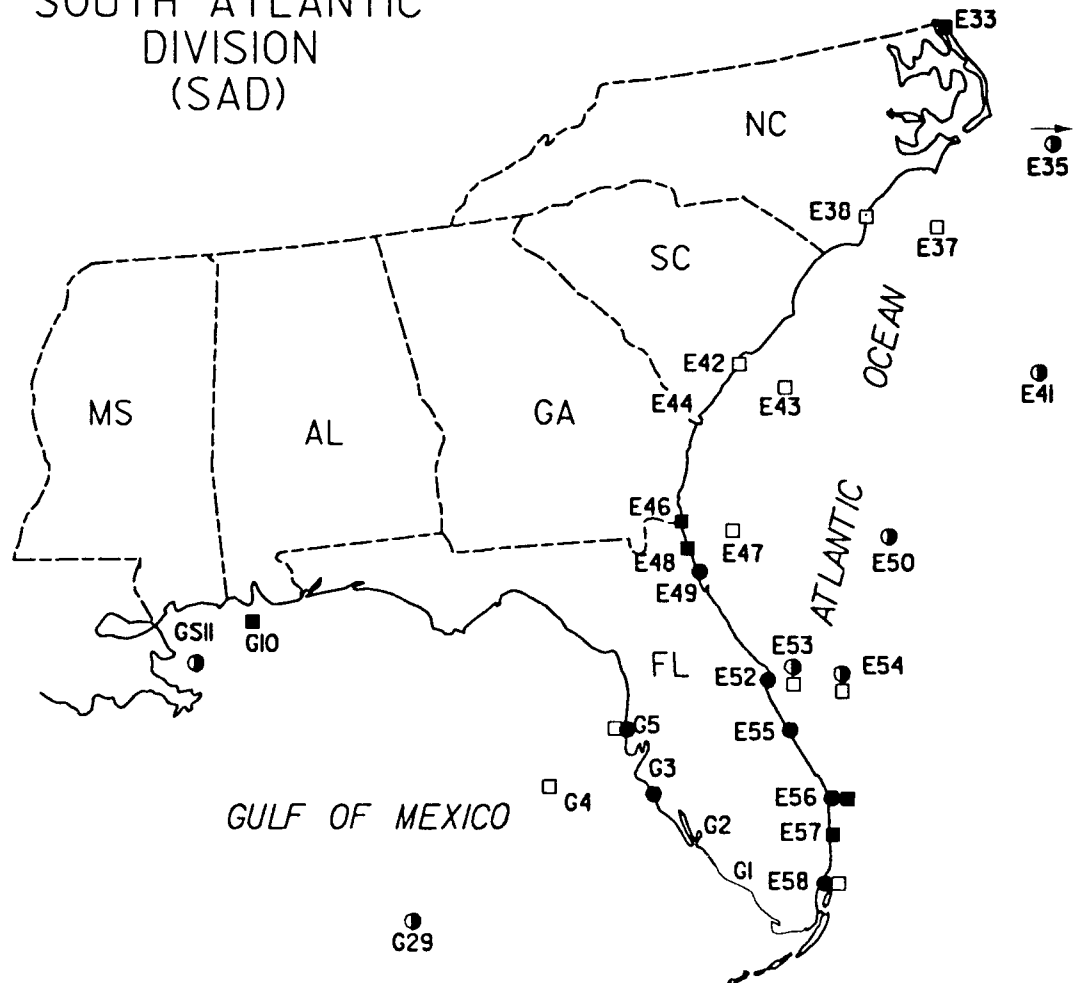


## LEGEND

| E32 (TYP) | MAP INDEX NUMBER                       |
|-----------|--|
| □         | DIRECTIONAL GAGE - SCHEDULED           |
| ■         | DIRECTIONAL GAGE - EXISTING            |
| ○         | NON-DIRECTIONAL GAGE - SCHEDULED       |
| ●         | NON-DIRECTIONAL GAGE - NOT FWGP FUNDED |



# SOUTH ATLANTIC DIVISION (SAD)



## LEGEND

|           |  |
|-----------|--|
| E58 (TYP) | MAP INDEX NUMBER                       |
| □         | DIRECTIONAL GAGE - SCHEDULED           |
| ■         | DIRECTIONAL GAGE - EXISTING            |
| ●         | NON-DIRECTIONAL GAGE - EXISTING        |
| ○         | NON-DIRECTIONAL GAGE - NOT FWGP FUNDED |



# FIELD WAVE GAGING PROGRAM - GAGE DEPLOYMENT PLAN

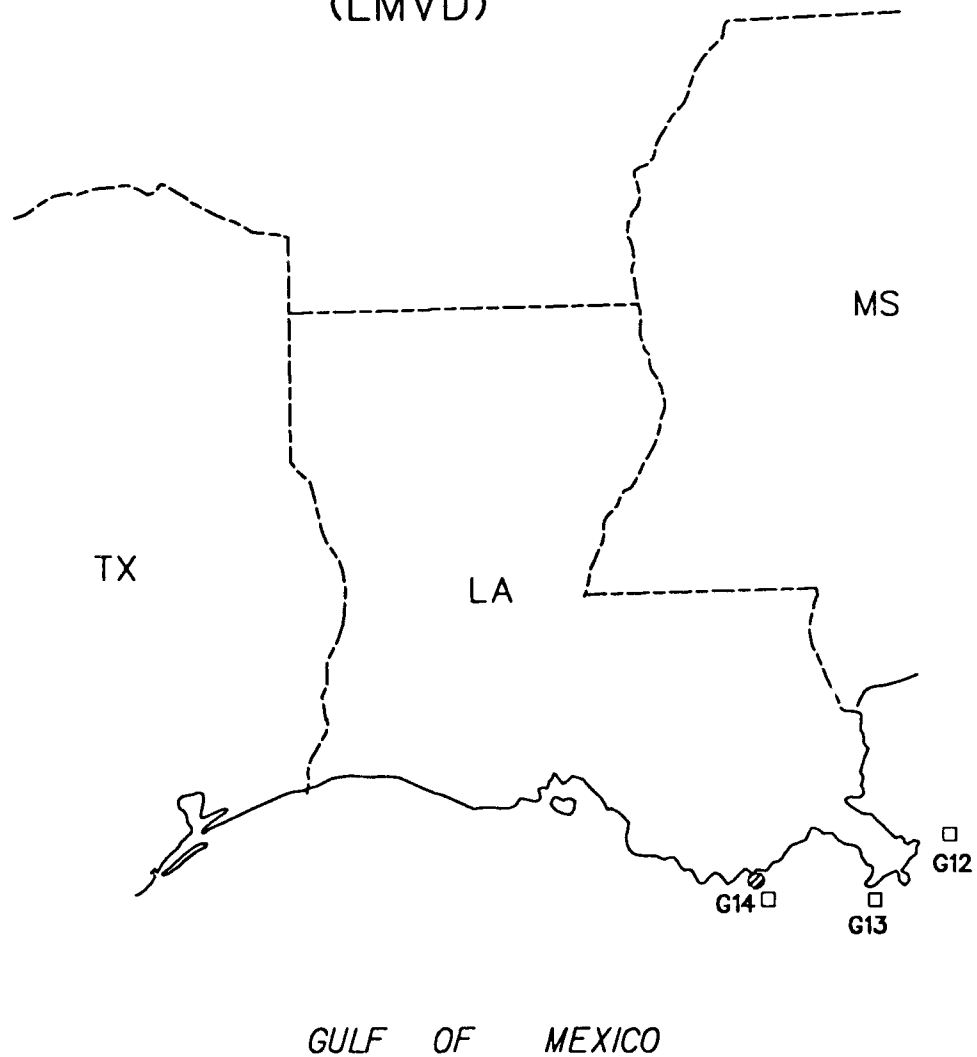
DIVISION SAD

| MAP<br>INDEX<br>NO. | AREA NAME            | DATA NEEDS |               |          |       |          |       | MODEL<br>VERIFICATION |  | GAGE STATUS        |                    |      | GAGE DEPLOYMENT |      |      |      | COMMENTS                                     |
|---------------------|----------------------|------------|---------------|----------|-------|----------|-------|-----------------------|--|--------------------|--------------------|------|-----------------|------|------|------|--|
|                     |                      | DIR. WAVES | NONDIR. WAVES | TIDES/WL | WINDS | CURRENTS | OTHER |                       |  | GAGE<br>YEARS<br>⊙ | GAGE<br>YEARS<br>∅ | CFY  | BFY             | FY   | FY   | FY   |  |
| E53                 | Canaveral            | •          |               |          | •     |          |       |                       |  | 1                  |                    | 0000 | 0000            | 0000 | 0000 | 0000 |  |
| E54                 | E. Canaveral         | •          |               |          | •     |          |       |                       |  | 10                 |                    | 0000 | 0000            | 0000 | 0000 | 0000 |  |
| E47                 | St. Marys Entrance   | •          |               |          | •     |          |       | WIS<br>RCP            |  |                    | 13                 | 0000 | 0000            | 0000 | 0000 | 0000 | Reposition offshore when USN<br>support ends |
| E43                 | South Carolina Bight | •          |               |          | •     |          |       | WIS                   |  |                    |                    |      |                 |      |      |      |  |
| E37                 | North Carolina Bight | •          |               |          | •     |          |       | WIS                   |  |                    |                    |      |                 |      |      |      |  |
| G4                  | Tampa Offshore       | •          |               |          | •     |          |       | WIS                   |  |                    |                    |      |                 |      |      |      |  |
| E42                 | Folley Island        | •          |               | •        |       |          |       | WIS                   |  |                    |                    |      |                 |      | X    | XXXX |  |
| E38                 | Wilmington           | •          |               | •        |       |          |       | WIS                   |  |                    |                    |      |                 |      |      | XXXX |  |
| G34                 | San Juan             | •          |               | •        |       |          |       | WIS                   |  |                    |                    |      |                 |      |      | XX   |  |
| TOTALS              |                      |            |               |          |       |          |       |                       |  | 65                 |                    |      |                 |      |      |      |  |





LOWER MISSISSIPPI  
VALLEY DIVISION  
(LMVD)



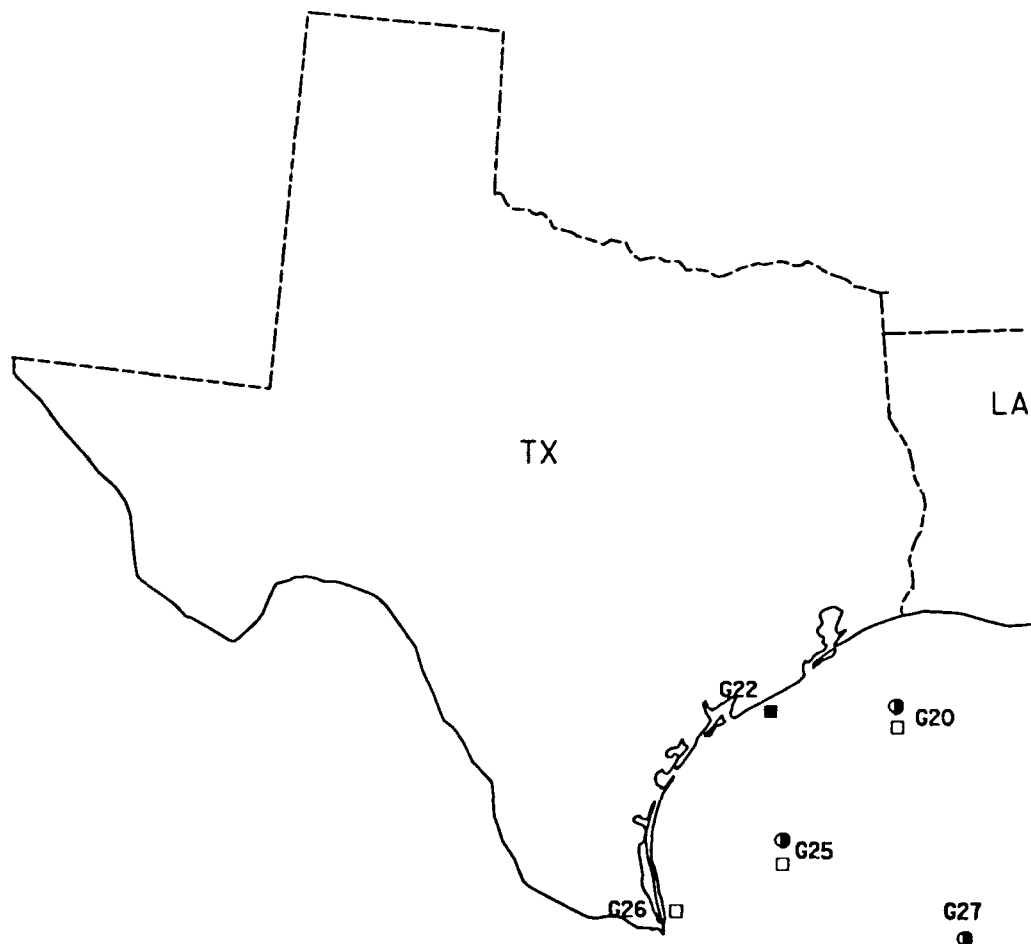
LEGEND

| G28 (TYP) | MAP INDEX NUMBER                       |
|-----------|--|
| □         | DIRECTIONAL GAGE - SCHEDULED           |
| ⊙         | NON-DIRECTIONAL GAGE - DISCONTINUED    |
| ●         | NON-DIRECTIONAL GAGE - NOT FWGP FUNDED |

□●  
G28



SOUTHWEST  
DIVISION  
(SWD)



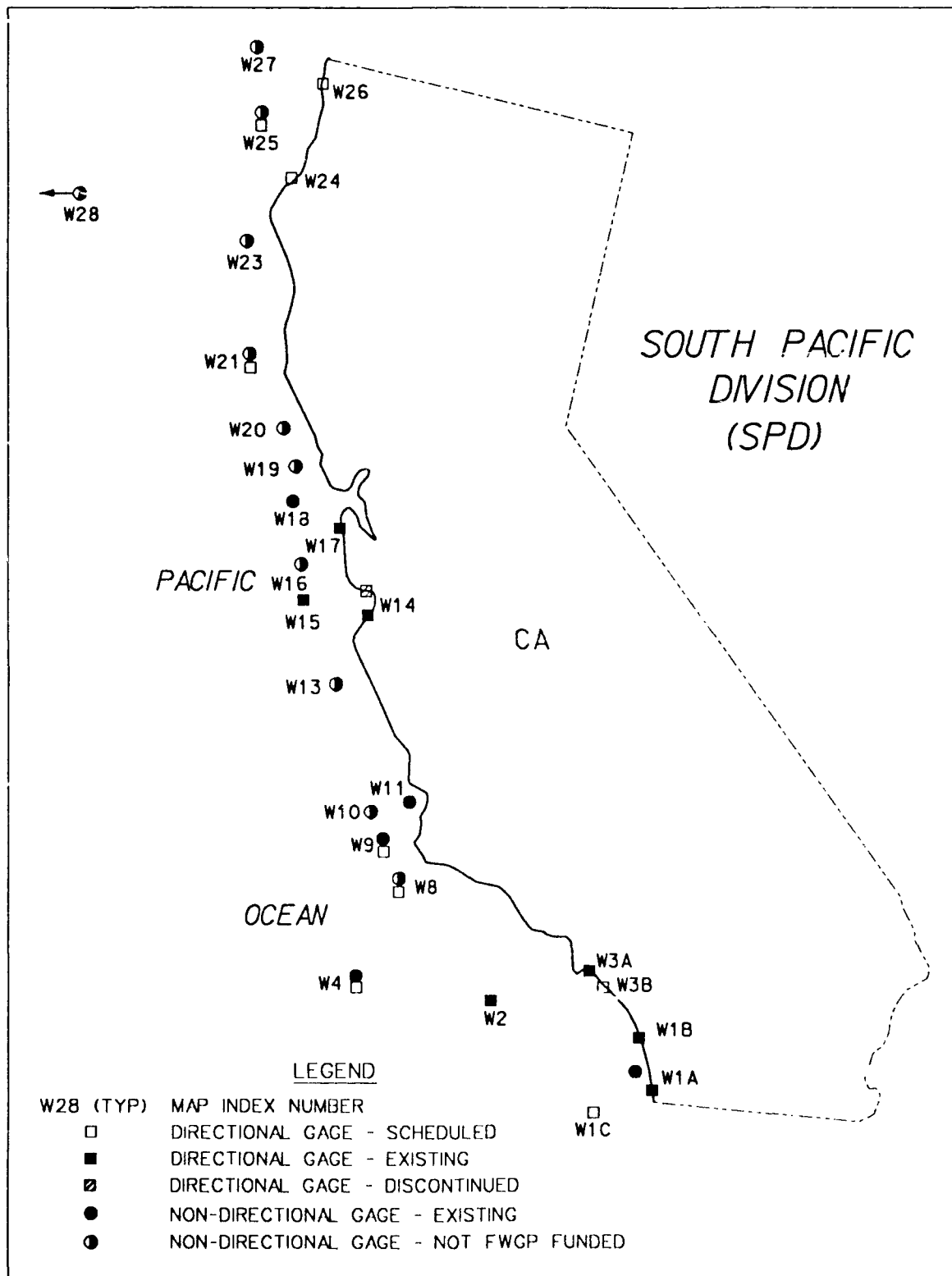
LEGEND

|           |  |
|-----------|--|
| G27 (TYP) | MAP INDEX NUMBER                       |
| □         | DIRECTIONAL GAGE - SCHEDULED           |
| ■         | DIRECTIONAL GAGE - EXISTING            |
| ●         | NON-DIRECTIONAL GAGE - NOT FWGP FUNDED |

# FIELD WAVE GAGING PROGRAM - GAGE DEPLOYMENT PLAN

DIVISION SWD

| MAP<br>INDEX<br>NO. | AREA NAME         | DATA NEEDS      |                    |               |            |               |       | MODEL<br>VERIFICATION | GAGE STATUS        |                    |           | GAGE DEPLOYMENT |          |          |          | COMMENTS                                    |
|---------------------|-------------------|-----------------|--------------------|---------------|------------|---------------|-------|-----------------------|--------------------|--------------------|-----------|-----------------|----------|----------|----------|---|
|                     |                   | DIR. WAVES<br>☉ | NONDIR. WAVES<br>○ | TIDES/WL<br>Σ | WINDS<br>≡ | CURRENTS<br>→ | OTHER |                       | GAGE<br>YEARS<br>☉ | GAGE<br>YEARS<br>○ | CFY<br>90 | BFY<br>91       | FY<br>92 | FY<br>93 | FY<br>94 |   |
| G22                 | Matagorda         | ●               |                    | ●             |            |               |       | WIS<br>SED            | 0                  | 0                  | ●         | ●               | ●        | ●        | XXXX     | Installation by MSCP                        |
| G20                 | North Texas Coast | ●               |                    |               | ●          |               |       | WIS                   | 0                  | 0                  | 0         | 0               | 0        | 0        | 0        | Upgrade NDBC 3M buoy;<br>cost-sharing w/MMS |
| G25                 | South Texas Coast | ●               |                    |               | ●          |               |       | WIS                   | 0                  | 0                  | 00        | 000             | 0        | 0        | 0        | Upgrade NDBC 3M buoy;<br>cost-sharing w/MMS |
| G26                 | Brownsville       | ●               |                    | ●             |            |               |       | WIS<br>RCP            | 0                  | 0                  |           |                 |          | XX       | XXXX     |   |
|                     |                   |                 |                    |               |            |               |       |                       |                    |                    |           |                 |          |          |          |   |
|                     |                   |                 |                    |               |            |               |       |                       |                    |                    |           |                 |          |          |          |   |
|                     |                   |                 |                    |               |            |               |       |                       |                    |                    |           |                 |          |          |          |   |
|                     |                   |                 |                    |               |            |               |       |                       |                    |                    |           |                 |          |          |          |   |
|                     |                   |                 |                    |               |            |               |       |                       |                    |                    |           |                 |          |          |          |   |
|                     |                   |                 |                    |               |            |               |       |                       |                    |                    |           |                 |          |          |          |   |
|                     |                   |                 |                    |               |            |               |       |                       |                    |                    |           |                 |          |          |          |   |
| TOTALS              |                   |                 |                    |               |            |               |       |                       | 0                  | 0                  | 3         | 3               | 3        | 4        | 4        |   |



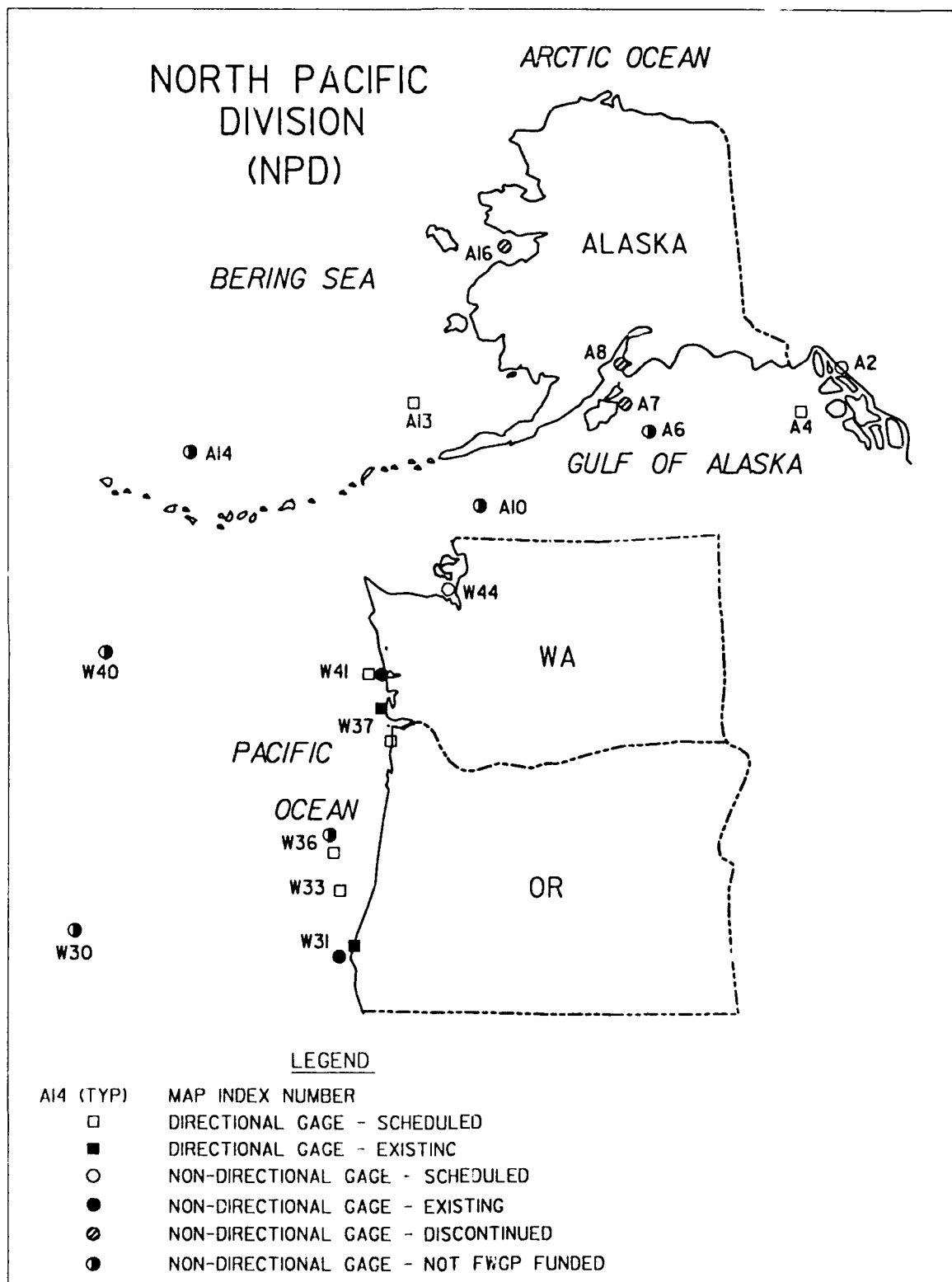
DIVISION 100

| MAP<br>INDEX<br>NO. | AREA NAME          | DATA NEEDS      |                    |               |            |               |       | MODEL<br>VERIFICATION | GAGE STATUS        |                    |              | GAGE DEPLOYMENT |              |      |      | COMMENTS |  |
|---------------------|--------------------|-----------------|--------------------|---------------|------------|---------------|-------|-----------------------|--------------------|--------------------|--------------|-----------------|--------------|------|------|----------|--|
|                     |                    | DIR. WAVES<br>0 | NONDIR. WAVES<br>○ | TIDES/WL<br>Σ | WINDS<br>↗ | CURRENTS<br>↑ | OTHER |                       | GAGE<br>YEARS<br>☉ | GAGE<br>YEARS<br>□ | BFV          | FV              | FY           | FY   |      |          |  |
| W1-A                | San Diego          | ●               |                    | ●             |            |               | ●     | WIS                   | 8                  | XXXX<br>0000       | XXXX<br>0000 | XXXX<br>XXXX    | XXXX<br>XXXX | 92   | 93   | 94       | Tsunami station<br>Replace Mission Bay buoy w/array                                      |
| W1-13               | Oceanside          | ●               |                    | ●             |            |               |       | WIS<br>SED            | 3                  | XXXX               | XXXX         | XXXX            | XXXX         | XXXX | XXXX | XXXX     | Assumes continuing SPD support   |
| W2                  | Catalina Ridge     | ●               |                    |               | ●          |               |       | WIS<br>RCP            | 8                  | 0                  | 0000         | ////            | ////         | //// | //// | ////     | Upgrade NDBC 10M buoy #46025<br>cost-sharing w/MCCP                                      |
| W4                  | South Calif. Bight | ●               |                    |               | ●          |               |       | WIS                   | 7                  | 0                  | 0000         | ////            | ////         | //// | //// | ////     | Co-op w/USNI relocated Bigg Rock<br>directional waverider to permit<br>southern exposure |
| W8                  | Point Conception   | ●               |                    |               | ●          |               |       | WIS                   | 8                  | 0                  | 0000         | 0000            | ////         | //// | //// | ////     | Upgrade NDBC 10M buoy #46023<br>assumes continued cost-sharing<br>w/MMS                  |
| W9                  | Point Arguello     | ●               |                    | ●             |            | ●             | ●     | WIS                   | 4                  | 0                  | XXXX         | XXXX            | XXXX         | XXXX | XXXX | XXXX     | Tsunami station<br>Convert Harvest Platform gage to<br>slope array                       |
| W11                 | Morro Bay          |                 | ●                  |               |            |               |       | WIS                   | 5                  | 0                  | 0000         | 0000            | 0000         | 0000 | 0000 | 0000     | Waverider supported by PC&E at<br>Diablo Canyon  |
| W14                 | Monterey Bay       | ●               |                    | ●             |            |               | ●     | WIS                   | 8                  | XXXX<br>XXXX       | XXXX<br>XXXX | XXXX<br>XXXX    |              |      |      |          | Tsunami station<br>Correlate w/Monterey offshore<br>buoy (w15)                           |
| W15                 | Monterey Offshore  | ●               |                    |               | ●          |               |       | WIS                   | 1                  | 2                  | ////         | ////            | ////         | //// | //// | ////     | Maintain NDBC 3M buoy #46042   |
| TOTALS              |                    |                 |                    |               |            |               |       |                       |                    |                    |              |                 |              |      |      |          |  |

# FIELD WAVE GAGING PROGRAM - GAGE DEPLOYMENT PLAN

DIVISION SP3

| MAP INDEX NO. | AREA NAME         | DATA NEEDS |               |          |       |          |       | GAGE STATUS        |            |            | GAGE DEPLOYMENT |          |          |        | COMMENTS   |
|---------------|-------------------|------------|---------------|----------|-------|----------|-------|--------------------|------------|------------|-----------------|----------|----------|--------|--|
|               |                   | DIR. WAVES | NONDIR. WAVES | TIDES/WL | WINDS | CURRENTS | OTHER | MODEL VERIFICATION | GAGE YEARS | GAGE YEARS | CFY             | BFY      | FY       | FY     |  |
| W17           | San Francisco     | •          | •             | •        |       | •        | •     | WIS                | 8          | 3          | XXXX            | XXXX     |          |        | Surf station<br>Slope array at Pt. Montez                    |
| W18           | Farallon Islands  |            | •             |          |       |          |       | WIS                | 7          | 0          | 0000            | 0000     | 0000     | 0000   | Waverider supported by City of San Francisco                 |
| W21           | Point Arena       | •          |               |          | •     |          |       | W-S                | 9          | 0          | 0000            | 0000     | 0000     | 0000   | Upgrade NDBC 10M buoy #46014                                 |
| W38           | Redondo Beach     | •          |               | •        |       |          |       | WIS RCP            | 0          | 0          | 0000            | XXXX (-) | XXXX (-) | XXXX   | Four DWGs and one NDBC 3M directional buoy installed by WCCP |
| W24           | Humboldt          | •          |               | •        |       |          |       | WIS                | 0          | 0          |                 |          | XX       | XXXX   |  |
| W25           | Eel River         | •          |               |          | •     |          |       | WIS                | 8          | 0          | 0000            | 000      | X        | XXXX   | Replace NDBC Nomad buoy w/3M directional buoy at #46022      |
| W26           | Crescent City     | •          | •             | •        |       |          |       | WIS                | 2          |            |                 |          |          | X XXXX |  |
| W1-C          | San Pedro Channel | •          |               |          | •     |          |       | WIS                | 0          | 0          |                 |          |          | XX     | Index gage for Southern California                           |
|               |                   |            |               |          |       |          |       |                    |            |            |                 |          |          |        |  |
|               |                   |            |               |          |       |          |       |                    |            |            |                 |          |          |        |  |
| TOTALS        |                   |            |               |          |       |          |       |                    | 75         | 29         | '5              | '6       | '6       | '6     |  |





# FIELD WAVE GAGING PROGRAM - GAGE DEPLOYMENT PLAN

DIVISION \_\_\_\_\_ NPD \_\_\_\_\_

| MAP<br>INDEX<br>NO. | AREA NAME           | DATA NEEDS      |                    |               |            |               | MODEL<br>VERIFICATION | GAGE STATUS        |                    |      | GAGE DEPLOYMENT |              |              |              | COMMENTS                                     |
|---------------------|---------------------|-----------------|--------------------|---------------|------------|---------------|-----------------------|--------------------|--------------------|------|-----------------|--------------|--------------|--------------|--|
|                     |                     | DIR. WAVES<br>☉ | NONDIR. WAVES<br>☉ | TIDES/WL<br>⌵ | WINDS<br>⌵ | CURRENTS<br>→ | OTHER                 | GAGE<br>YEARS<br>☉ | GAGE<br>YEARS<br>☉ | CFY  | BFY             | FY           | FY           | FY           |  |
|                     |                     | •               | •                  | •             | •          |               |                       | 6                  | 0                  | 0000 | 0000            | XXXX         | XXXX         | XXXX         |  |
| W41                 | Grays Harbor        | •               |                    | •             |            |               | WIS                   | 6                  | 0                  | 0000 | 0000            | XXXX         | XXXX         | XXXX         | Replace wave rider with slope array in FY 92 |
| W31                 | Coquille            | •               |                    | •             |            |               | WIS                   | 6                  | 2                  | XXXX | XXXX            | XXXX         | XXXX         | XXXX         | Replace waver rider in FY 91                 |
| W37                 | Columbia River Ent. | •               |                    | •             |            |               | WIS                   | 4                  | 3                  | XXXX | XXXX            | XXXX         | XXXX         | XXXX         | Add slope array on south side in FY 92       |
| W36                 | Cape Foulweather    | •               |                    |               | •          |               | WIS                   | 2                  | 0                  | 0000 | 00//            | ////         | ////         | ////         | Upgrade NDBC 3M buoy #46040                  |
| A4                  | South East Alaska   | •               |                    |               | •          |               | WIS                   |                    |                    |      | /               | ////         | ////         | ////         |  |
| W33                 | Cape Arago          | •               |                    |               | •          |               | WIS                   |                    |                    |      |                 | /            | ////         | ////         |  |
| A2                  | Sitka               | •               | •                  |               | •          |               | WIS                   |                    |                    |      |                 | 0000<br>XXXX | 0000<br>XXXX | 0000<br>XXXX |  |
| W44                 | Seattle             | •               | •                  |               | •          |               |                       |                    |                    |      |                 |              | 00<br>XX     | 0000<br>XXXX |  |
| A13                 | Pribilof Islands    |                 |                    |               |            |               | WIS                   |                    |                    |      |                 |              |              | /            |  |
| TOTALS              |                     |                 |                    |               |            |               |                       | 18                 | 5                  | 5    | 5               | 7            | 9            | 10           |  |

